THE HEATING AND VENTILATING MAGAZINE

VOL. VI., NO. 12 NEW YORK, DECEMBER, 1909 $1.00 a year, 10 cents a copy

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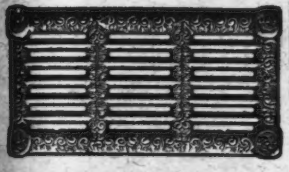

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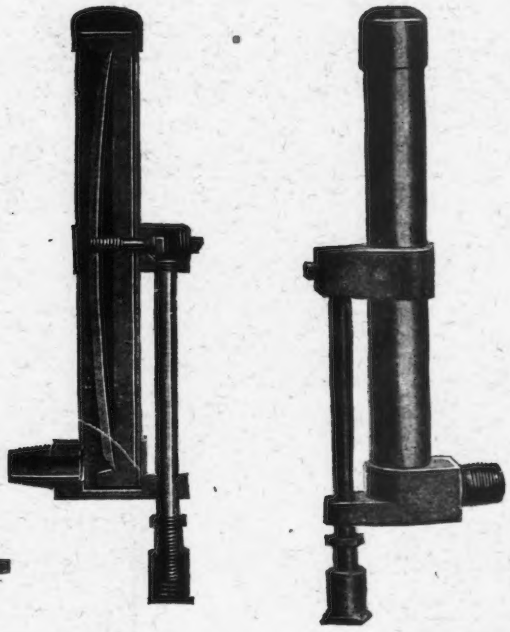

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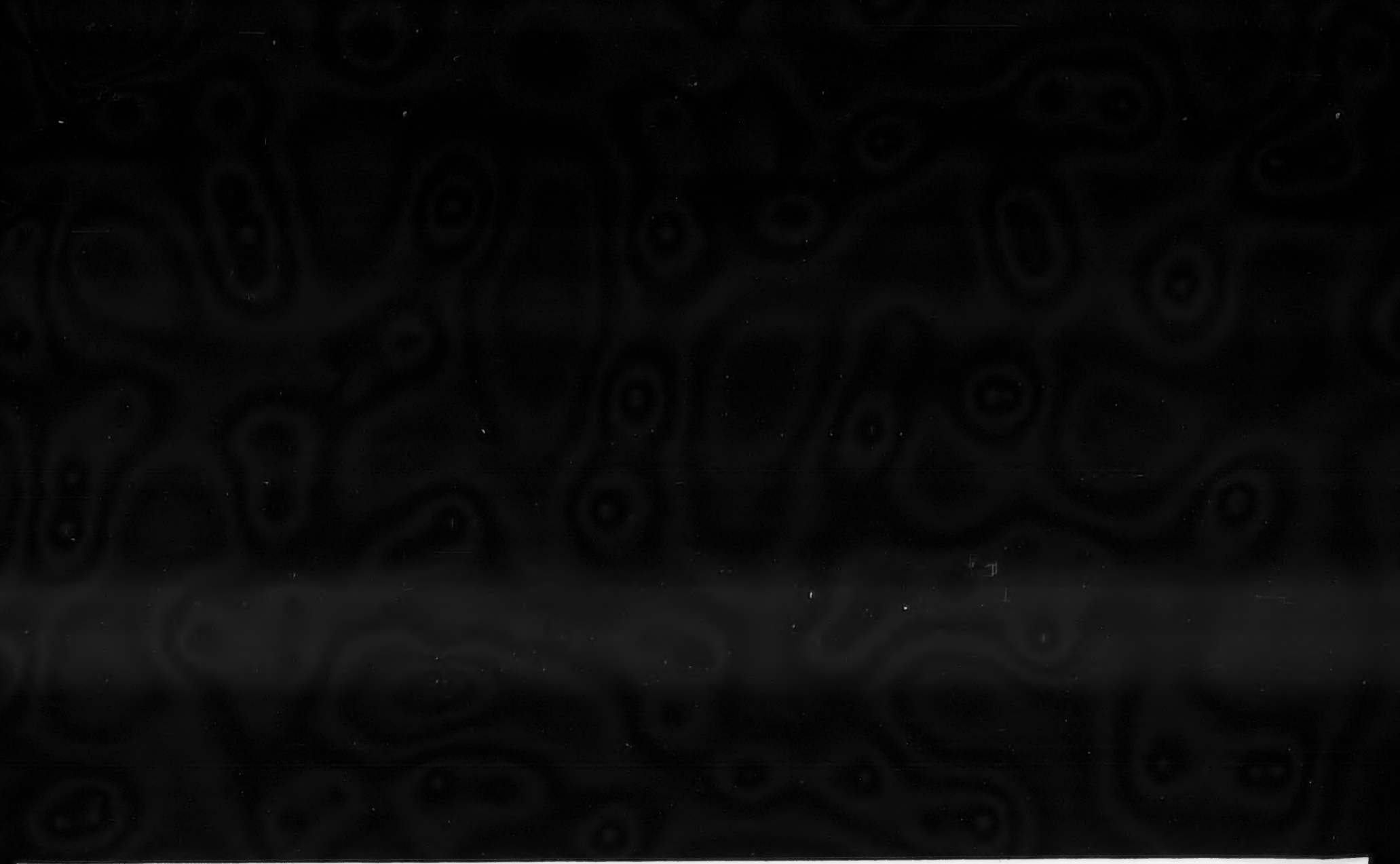

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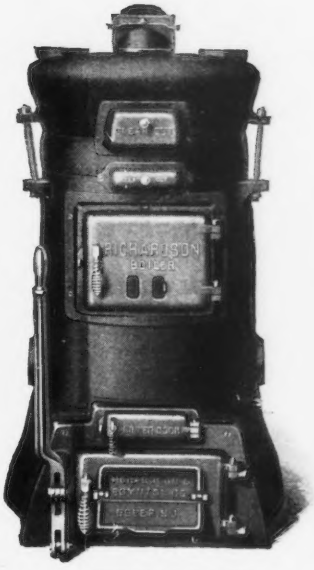
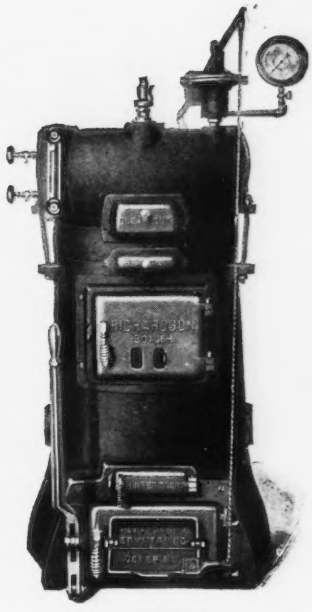


HOT WATER



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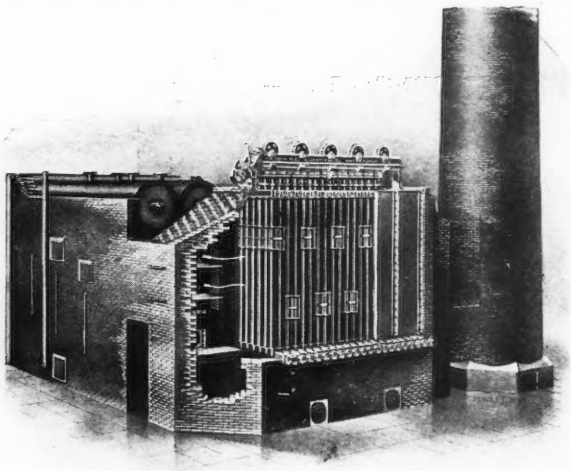

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If you will give us some idea of the amount of coal you burn in 24 hours under the power boilers, the temperature of the escaping flue gases, and the number of square feet of exposed surface in your shops, we will submit estimates to you for heating the building with waste heat. Also ask for our

Catalog "106H"

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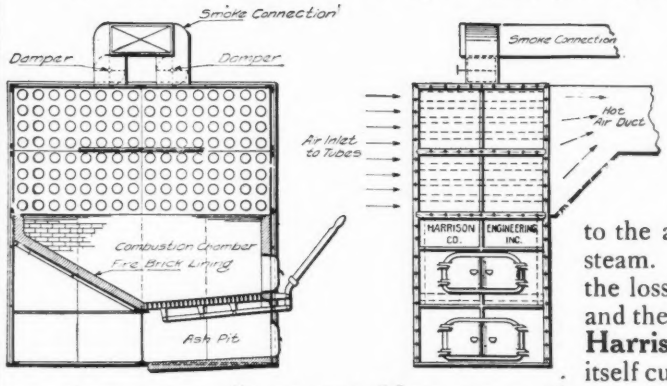

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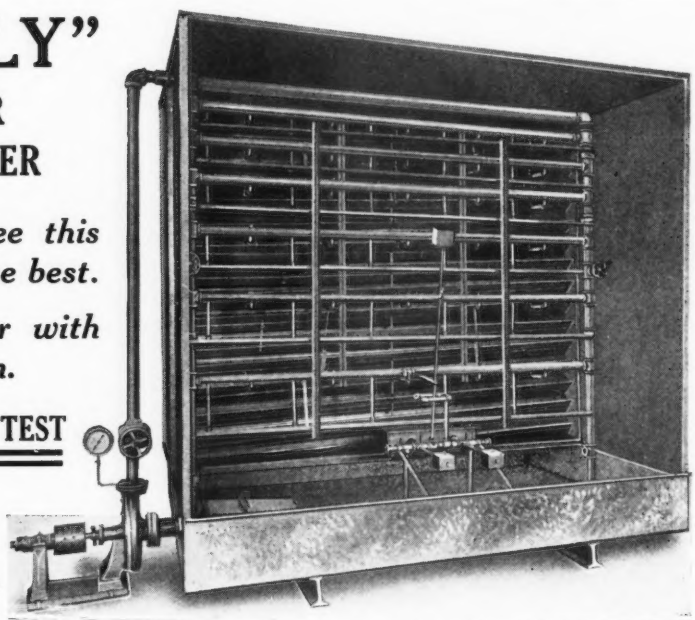

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The Heating and Ventilating Magazine

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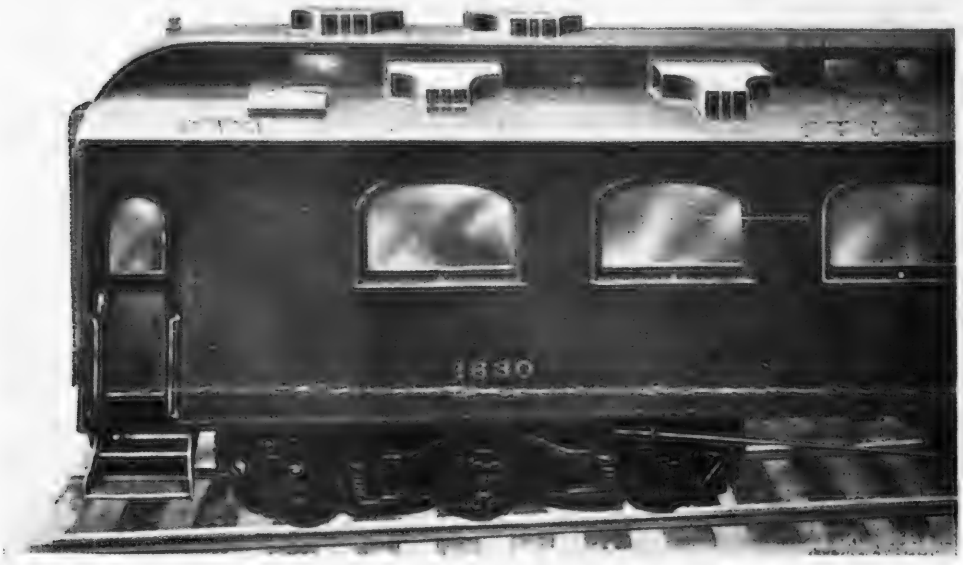
1123 BROADWAY NEW YORK DECEMBER, 1909



KITCHEN END OF DINING CAR EQUIPPED WITH GARLAND VENTILATORS

An Automatic System of Railroad Car Ventilation

An aroused sentiment on the part of the traveling public for better ventilation of railroad coaches has resulted in a number of methods for accomplishing this object, the movement of the train being usually depended upon to furnish the necessary motive force.

One of the most interesting of these systems is that designed by T. H. Garland, general agent refrigerator service of the Chicago, Burlington & Quincy Railroad. The extent to which this system is being applied to various classes of passenger equipment would seem to indicate that the problem of furnishing fresh and pure air to railway travelers has been successfully solved.

The device, as recently perfected, is a simple one, being constructed upon the aspirator and induction principles, which exhaust the impure air from the car, the arrangement being such that dirt, smoke, cinders, rain or snow cannot enter the car through the ventilators, as the ventilation of the car is accomplished by drawing out the air; the danger of drafts is eliminated.

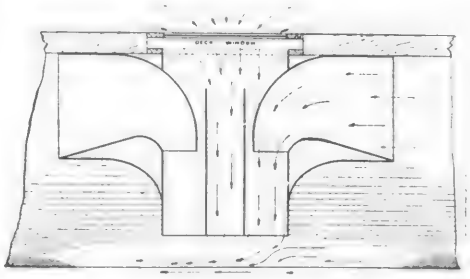
By referring to the illustrations showing the construction of this type of ventilator, it will be seen that large

openings in the ventilator face toward either end of the car, and these form the ducts through which the outside air passes. The course of the air is controlled by the right-angle bend which causes the air to leave the ventilator at the outer edge of the car roof. The suction thus formed draws the air from the interior of the car through the opening provided for that purpose. The ventilators are arranged so that they work equally well with the car going in either direction.

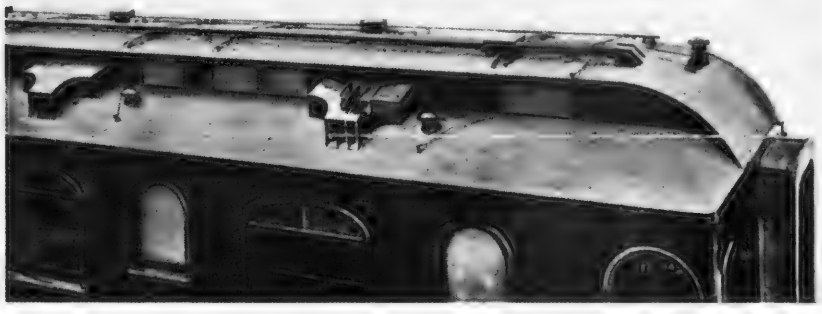
The air capacity of the average car is about 5,000 cu. ft., and the average number of ventilators installed in each car is usually ten. With this arrangement the following results of tests have been secured:

Speed of Train, Miles per Hour	Average Exhaust Each Ventilator per Hour, Cu. Ft.	Total Exhaust per Hour (10 Ventilators), Cu. Ft.
30	15,000	150,000
45	20,000	200,000
50	27,000	270,000
60	36,000	360,000

The Garland system of car ventilation has been found equally applicable to refrigerator cars, where insufficient ventilation quickly results in great damage to such perishable freight as berries, peaches, oranges and other fruits. The upper tiers in the cars become soft and mouldy, due to the warm air and gases that accumulate in the upper part of the car. The only difference in the arrangement of the ventilators is their location in the center of the car between the doors, one ventilator being placed on either side of the roof. An average sized freight car contains about 2,000 cu. ft. of space, and tests have shown that at a speed of 30 miles per hour it is possible to exhaust 10,000 cu. ft. of air per hour, which would be equivalent to 10 changes per hour.



PLAN OF GARLAND CAR VENTILATOR



GARLAND VENTILATOR APPLIED TO PASSENGER CARS

Variations in Sun Heat

Until recently it was taken for granted that the heat given out by the sun was always the same in amount not differing one day from another, or one year from another. But it has been finally ascertained through a long series of experiments, that the amount of heat given out by the sun is constantly varying, and that at times it is not less than one-sixth greater than at other times, a difference amply sufficient to account for exceptionally cool summers or warm winters on the earth. Indeed, there can no longer be any doubt that we owe our weather to a great extent to the solar luminary, and our government is at present engaged in a painstaking study of the subject in the observatory on Mount Whitney, Cal., the expectation being that when it has come to be more fully understood, science will be able by observation of the sun's activity to make forecasts of meteorological conditions for at least six months in advance.—*Reader Magazine.*

Advantages of "Split" System in Schoolhouse Heating and Ventilation

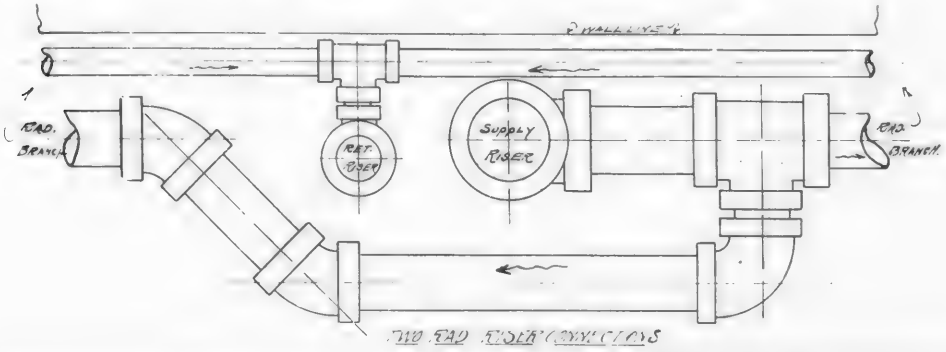
Plant Installed in the Woodward High School, Cincinnati, O.

By E. N. Hannaford

MECHANICAL ENGINEER, CINCINNATI BOARD OF EDUCATION

See Pages 16-17 for Double-page Plan of Heating and Ventilating System

The heating and ventilating system for the Woodward High School is typical in operation of the many plants installed in the Cincinnati schools during the last few years. Previous to this time straight hot-blast systems in connection with some auxiliary direct radiation were installed and operated with the customary degree of success and satisfaction. Upon more careful study, however, of the requirements and conditions peculiar to school buildings, the system was changed to the present type of design in order to provide a more elastic plant to meet the varying demands in schoolhouse heating and ventilating.



TWO RADIATOR RISER CONNECTIONS, STRAIGHT POSITION, WOODWARD HIGH SCHOOL

The present type has proven satisfactory in every respect and we have found that we are able to obtain more uniformly satisfactory results by means of the "split" system than by the methods formerly employed. The advantages we have found in the "split" system are as follows:

ADVANTAGES OF "SPLIT" SYSTEM

1. Greater elasticity in operation; either the direct or fan, by raising the steam pressure, being sufficient to tide over a break-down in either branch of the system.

2. In the late spring or early fall, when only a small amount of heat is necessary, the direct radiation will take care of it and permit of window ventilation. This last remark will no doubt be combated, but practical experience, nevertheless, proves that under certain conditions window ventilation is not only permissible, but desirable. On the approach of cold weather the fan branch of the system is cut in, after which the windows are closed and locked.

The direct radiation is figured of sufficient capacity to take care of the heat losses through the glass and net exposed wall, plus a factor of safety governed by exposure, etc.

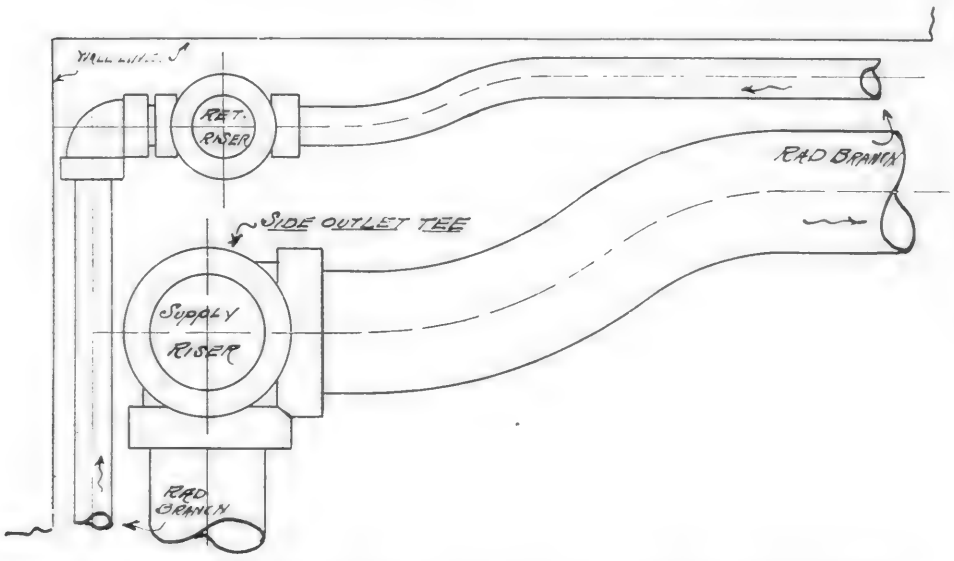
The fan coils are of sufficient capacity to heat the required amount of air handled to approximately 85° F. in zero weather with steam at atmospheric pressure.

The direct radiation in rooms is controlled automatically by means of diaphragm valves, while the air in the ducts is held to a given temperature by means of a duct thermostat operating by-pass dampers under retempering coils and a thermostat between tempering and retempering coils operating by-pass dampers under tempering coils.

The temperature of the air as it

leaves the tempering coils before entering the air washer is held at 40° F., while the temperature of the air in the trunk duct is held at from 72° to 74° F., according to the length of

The amount of air delivered to each room is somewhat in excess of 30 cu. ft. per occupant per minute, and the two fans have a combined capacity of approximately 132,000



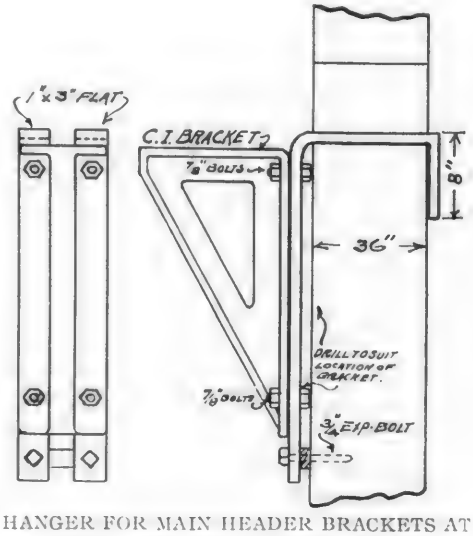
TWO RADIATOR RISER CONNECTIONS, FROM CORNER POSITION, WOODWARD HIGH SCHOOL

duct. The air after passing the tempering coils is drawn through air washers, then through retempering coils into the fan and discharged through trunk ducts at a velocity of approximately 1,500 ft. per minute into vertical galvanized iron risers at approximately 800 ft. per minute, and into the rooms about 8 ft. above floor line at 300 ft. per minute.

Movable deflectors are installed at all heat outlets and vanes or partitions are installed in all top-heads for the proper distribution of air over the entire face of the heat outlet. The vent screens are figured at the same velocity and the vertical galvanized iron vent risers are carried to a large furred space over corridor of fourth floor, out of which ventilators of proper design and size are led. In these ventilators dampers are installed which are controlled by the air pressure in the temperature regulating system and are closed each night by means of a switch in the sub-basement, thus preventing down-drafts and loss of heat over night.

cu. ft. of air per minute at ½ oz. pressure. These fans are operated by means of 18-in. x 12-in. horizontal center crank engines.

The lavatories and locker rooms throughout the building are ventilated by means of an electrically driven steel plate exhaust fan located

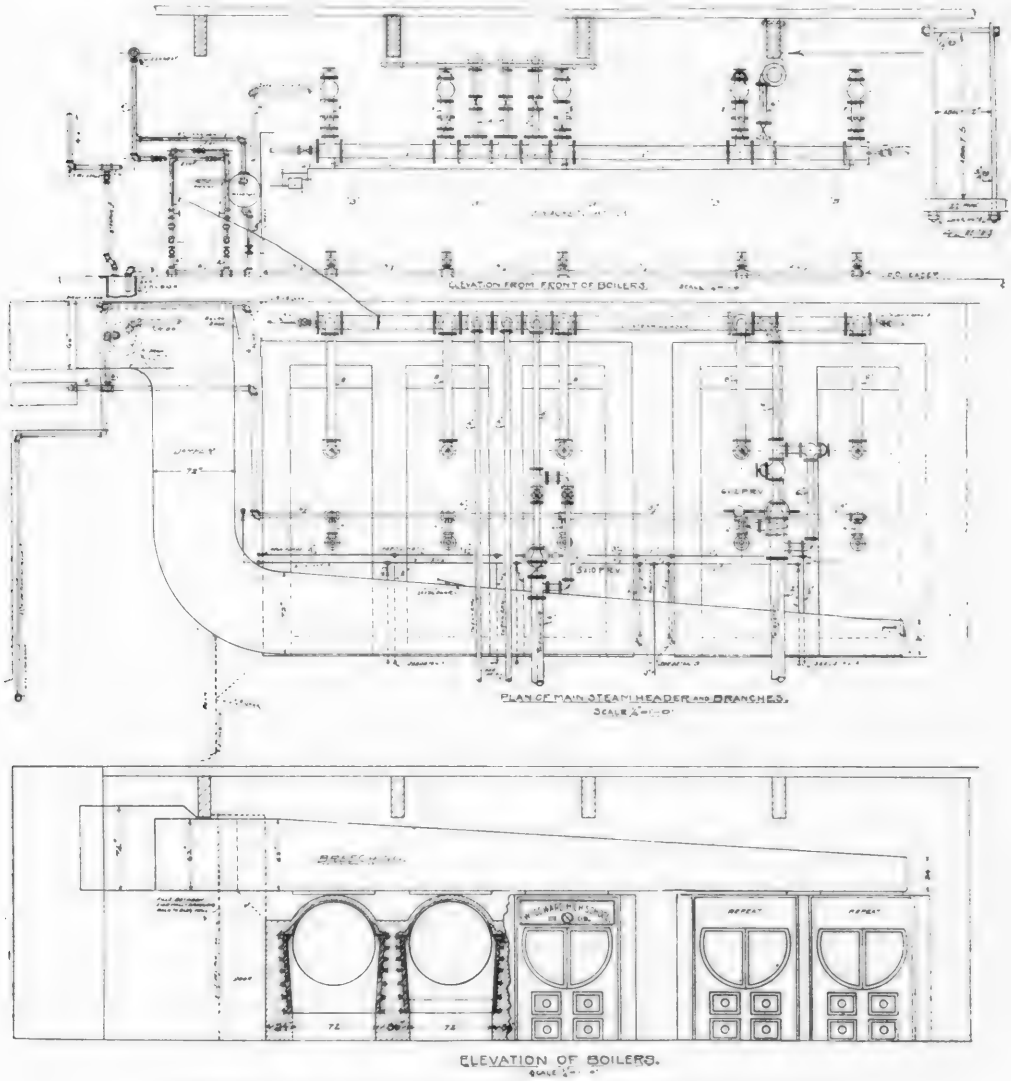


HANGER FOR MAIN HEADER BRACKETS AT POINT B (ELEVATION FROM FRONT OF BOILERS)

in sub-basement. The air is drawn through the closets and urinals, thus preventing entirely the escape of any odors into the rooms. The chemical laboratories are provided with a separate electrically driven exhaust fan, which draws the fumes down through the top of the tables and discharges same above the roof line.

steam for the entire heating and ventilating system as well as for the domestic hot water supply, showers and plunge baths. The grates are of the slicing and chopping type with narrow bars.

The boiler feeders are two 7½-in. x 3½-in. x 10-in. duplex pumps, each

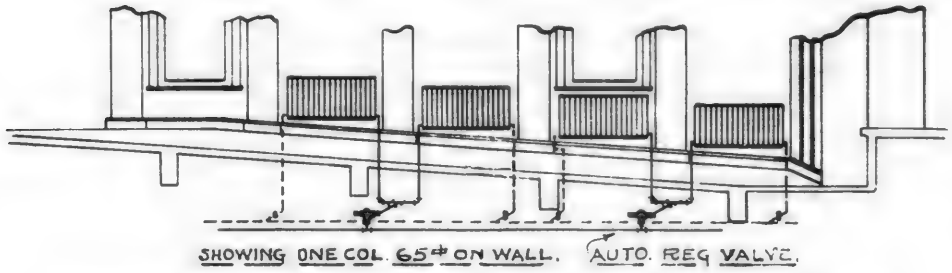


BOILER ROOM DETAILS, WOODWARD HIGH SCHOOL BUILDING

The boiler plant consists of five 72-in. x 18-ft. high pressure horizontal tubular boilers containing seventy 4-in. tubes each. High pressure boilers were installed with a view of installing generators at some later date. These boilers supply

of sufficient capacity to handle all the water of condensation from the entire system. The vacuum pumps are also in duplicate. Automatic feed water regulators are used in connection with feeds to boilers.

The returns from the heating and



ARRANGEMENT OF WALL RADIATORS AND CONNECTIONS IN ASSEMBLY ROOM, FIRST FLOOR, WOODWARD HIGH SCHOOL BUILDING

ventilating system are brought back through cooling coils placed in the fresh air intakes. By means of these cooling coils the necessity of jet water in the condenser heads of the vacuum pumps is eliminated. As a matter of precaution the cooling coils are by-passed.

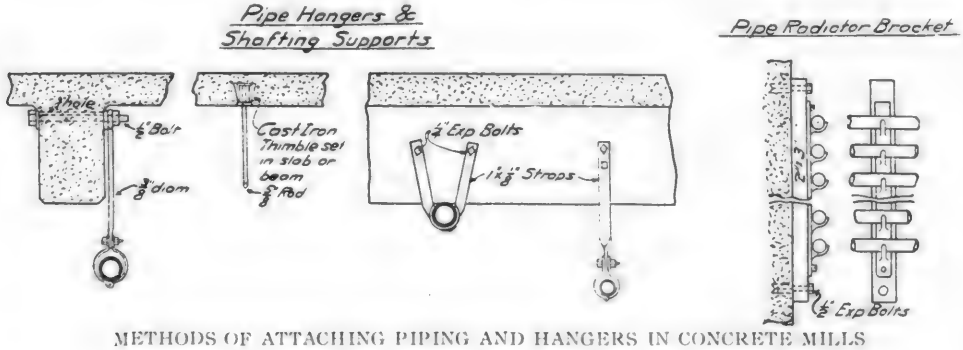
Attaching Shafting and Piping in Concrete Buildings

The attaching of shafting and piping and the handling of lighting wires in concrete buildings is frequently questioned by those contemplating erecting new buildings of this material. In a paper read before the National Association of Cotton Manufacturers, recently, the author, J. P. H. Perry tells of the different methods of taking care of this problem.

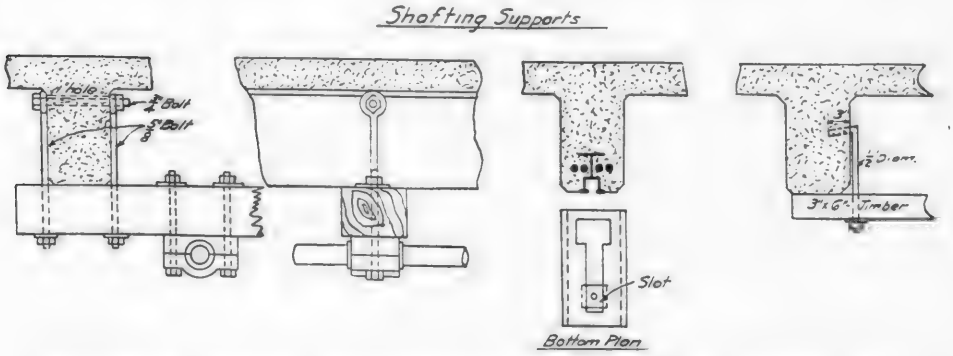
It is apparent from a study of the various schemes presented by Mr. Perry that piping or transmission lines can be provided for quite simply in a concrete structure. The sockets or holes, as the case may be, he states, are set or left in the forms before the concrete is poured. Cutout boxes, switches, plugs and conduits for electric light wires are provided for in the same manner.

The making of changes in piping or shafting or belt lines has caused many owners without experience in concrete buildings to decide against the material. This difficulty of cutting new holes through concrete floors or walls is not nearly so great as it seems on first thought. That concrete is hard to cut through is admitted, but that this is a serious fault is denied.

Ordinarily where a man puts up a new mill or factory he has his machinery and shafting layout well in mind and generally he knows just where each machine is to be set. If this is so, provision can quite easily be made for any bolts or hangers before the concrete is cast. Then, too, the modern tendency is toward individual motor drive, which eliminates long lines of shafting. But assuming that changes in machines or shafting or heating-pipes or belts have to be made in a reinforced concrete building, a floor can be cut through, or a beam can be tapped, and an expansion bolt or a hanger inserted. The difficulty of cutting through a 4-in. floor slab is very much less than is so widely supposed.



METHODS OF ATTACHING PIPING AND HANGERS IN CONCRETE MILLS



METHODS OF ATTACHING SHAFTING AND ELECTRIC WIRES IN CONCRETE MILLS

The Effect of Superheated Steam on Cast-Iron and Steel*

Cast Iron Fittings for Superheated Steam

By Prof. Ira N. Hollis, Boston, Mass.

The failure of a number of large cast iron fittings in use with superheated steam has rightly created a widespread suspicion of this material when exposed to high temperature. Yet on this subject there is very little information of a character to justify the wholesale substitution of steel castings for the ordinary heavy cast iron fittings. The latter have been used with success for many years at all degrees of temperature below actual redness, and in many stations now in operation with moderate degrees of superheating (say 100° F.) cast iron has never given the slightest trouble beyond the ordinary wear and tear.

The doubt as to the reliability of cast iron has seemed to spring up with its use in long pipe lines to steam turbines where the temperature has ranged from 550° to 600°. This would lead one to ask if the difficulty has not been in the design of the piping systems rather than in the character of the material. Has not the cast iron taken the brunt of a new service and has it not suffered in the estimation of the engineering public because the conditions of that service were not fully understood?

A vast amount of experiment and investigation would be required for the satisfactory reply to this question, and this brief paper is not intended as a reply, but rather to place before the society a record of some tests that may throw light on the subject. These tests were made for the Edison Illuminating Company, of Boston, for the purpose of determining the bursting strength under hydraulic pressure of some large fittings which were replaced with steel castings.

*A symposium consisting of two papers read at a meeting of The American Society of Mechanical Engineers in Boston, December 17, 1906

It may be well before giving the result of the tests to inquire what is actually known about cast iron subjected to high temperature; that is, known without the possibility of controversy:

Fittings have developed cracks and small changes of shape after a few months of actual service.

Fittings exposed separately to superheated steam at a temperature exceeding 500° F. have shown a permanent increase of some dimensions.

The tensile tests of pieces cut from fittings that had failed in service indicate in some cases the possibility of permanent loss of strength.

The remainder of the evidence in the case may be classed as good guess work based upon some preconceived theory as to the behavior of the constituent parts of cast iron in a rising temperature.

One of the curious and interesting qualities of cast iron is its permanent increase of dimensions under high temperature. This is paralleled by the permanent set of cast iron test pieces when subject to very moderate tensile stresses. In both cases the cast iron apparently continues to grow at a decreasing rate, at least in some dimensions, when the high temperature of tensile stress is repeated.

How long this growth would continue is not known. Its probable limit is the flow of the material under the ultimate breaking stress. Cast iron may not be peculiar in this respect and all materials may change permanently their dimensions under moderate stress, the change growing with each imposition of the same stress. There is no doubt of this where the yield point has been exceeded. It may also be that all materials change permanently under repeated application of high temperature.

That cast iron loses strength when ex-

posed to superheated steam at 600° is not conclusively proved. The most that can be said is that the test specimens taken out of cast iron fittings after one year's or more exposure to a temperature of 550° to 600°, have shown a surprising irregularity of strength in the same casting. But there is nothing to prove that new cast iron fittings have not a great lack of homogeneity. Irregularities exist in every casting, owing to the inability of the metal to flow when cooling below a certain temperature. Furthermore, the strength of a test piece cast from a given heat can rarely be taken as that of any selected part of the fitting cast from the same heat. It is common experience to find variations of strain in castings as well as variations of texture. Were any large, irregular casting cut into small test pieces, the variations of strength would probably be found to be quite as great as that reported later on in this paper. The demonstration of the loss of strength after long service with superheated steam does not seem either complete or conclusive.

A very brief description of the essential features of the Edison station will help to make clear what follows. The new part of the station is arranged in a series of complete units, each consisting of one vertical Curtis turbine and eight boilers set in pairs. The main steam line extends along the rear ends of the boilers just beneath the brick work, four 8-in. vertical steam mains connecting each pair of boilers with the main line. Three of the vertical mains discharge through gate valves into T's, and the fourth, at the end of the line, through a gate valve into a bend.

The first turbine units were provided throughout with cast iron fittings, which were ultimately replaced with steel fittings. No expansion or slip joints are used. The main steam line (something over 103 ft. long) is anchored at the turbine end and is allowed to expand freely in a longitudinal or horizontal direction, carrying the lower ends of the vertical mains with it. The steam pressure is 175 lbs., the superheating generally amounts to 150° F., although it is not constant. The actual temperature of the steam varies from 500° to 580°, so that the main line is changing in length from time to time, thus moving the lower ends of the vertical mains back and forth. A series of variable stresses are consequently introduced into all parts of the pipe system, probably affecting most seriously the T's. It is this aspect of the case, namely, the effect of varying stresses upon cast iron at high temperature, that must be studied before a sound verdict can be reached.

The castings in the South Boston station were first suspected of failure when nearly a year after the turbine plant had been in operation one of the 8-in. x 6-in. x 6 in. T's near the boiler showed signs of deterioration, cracks appearing near the junction of the offset with the body of the T and in the flanges. Another fitting of the same dimensions and location began to fail and was taken out after fourteen months' service. Both these T's were cut up for testing and the results were so much alike that only the second is given here, as that T had been exposed the longest to the strain.

A chemical analysis gave the following: carbon, 3.47; manganese, 0.10; phosphorus, 0.366; sulphur, 0.062; silicon, 1.41. The tensile strength of six pieces taken from different parts of the T was found to be: 12,646, 14,295, 26,080, 27,270, 27,440, 28,280 lbs. per sq. in. There thus appears to have been considerable variation of strength in the T unless the first two results are errors due to some faults in testing. Not considering them, the four other pieces do not appear to indicate any great falling off in service. They are as near together as would commonly be found in cast iron from the same heat. The material was supposed to be a first-rate quality of air furnace gun iron which should have been good for 25,000 to 30,000 lbs. per sq. in., but no tests or analyses of the heat from which this T was poured are on record.

Four test pieces cut from a larger T, 14 in. x 12 in. x 8 in., which had had about the same service as that from which the foregoing test pieces were cut, gave a tensile strength of 23,130, 23,480, 23,875, 24,170 lbs. per sq. in. Here again there was absolutely no proof that the material had deteriorated.

Three test pieces were taken, for comparison, from a large manifold which had been seven years in service with saturated steam, and the tensile strength was found to be 16,413, 16,550, 17,000 lbs. per sq. in. The nature of the cast iron was not known positively, but it was bought as air furnace gun iron.

It was fully recognized in the first of the foregoing tests that, while the material might not have suffered in service, nevertheless parts of the casting might have been weakened by the expansion stresses. For the purpose of testing this, two T's were removed from the line and broken by internal hydraulic pressure, thus affording a definite idea of the strength of the castings as a whole. A third casting, an L not previously in use, was added for comparison. The three fittings are shown in Fig. 1, in which the measured dimensions and the location of the fractures are given.

The material was the same as that used for all the fittings of the turbine unit, air furnace gun iron, and the chemical constituents were probably about the same. The two T's had been exposed to superheated steam of 578° F. and less for fifteen months, or longer, and when removed had given no indications of weak-

ness. A careful examination disclosed no appreciable distortion except in the faces of the flanges, which were no longer plane surfaces. There were several high spots that could not have existed when the flanges were faced off.

a square inch in area, and directly loaded by dead weight applied as the pressure increased. The indications of the small valve were constantly compared with a hydraulic gauge previously tested and calibrated at the Crosby manufactory.

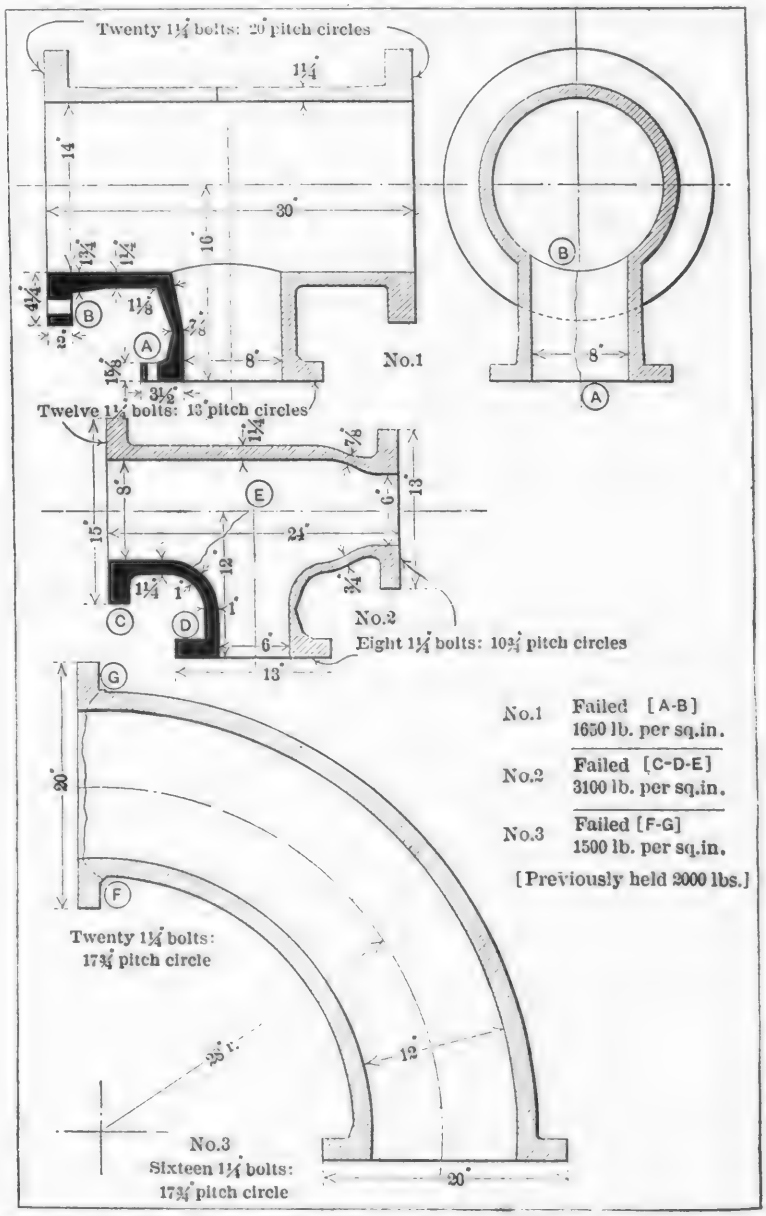

Twenty 1¼ bolts: 20 pitch circles
No.1
Twelve 1¼ bolts: 13 pitch circles
No.2
Eight 1¼ bolts: 10¾ pitch circles
No.1 Failed [A-B] 1650 lb. per sq.in.
No.2 Failed [C-D-E] 3100 lb. per sq.in.
No.3 Failed [F-G] 1500 lb. per sq.in.
[Previously held 2000 lbs.]
Twenty 1¼ bolts: 17¾ pitch circle
No.3
Sixteen 1¼ bolts: 17¾ pitch circle

FIG. 1. SHOWING POINTS OF FAILURE UNDER HYDRAULIC PRESSURE OF THREE CAST-IRON FITTINGS USED WITH SUPERHEATED STEAM

No. 1 was a 14-in. T with an 8-in. offset. The openings were closed by heavy cast iron plates fitted to the flanges and bolted. The pressure was produced by a steam driven outside packed plunger pump, and was measured by means of a small conical safety valve, one-tenth of

The fitting broke as shown at an internal pressure of 1,650 lbs. per sq. in. The plates covering the openings did not reinforce the T to any great extent, as the bolts were smaller than the holes and the joints around the flanges were leaking appreciably when the fracture occurred.

No. 2 fitting was an 8-in. x 6-in. T. It was broken in precisely the same manner as No. 1 and gave way at an internal pressure of 3,100 lbs. per sq. in.

No. 3 fitting was a 12-in. L. Its two openings were closed with cast iron plates and it was burst in the same way as the others. The joints practically gave out at a pressure of 2,000 lbs. per sq. in., although the pressure was kept on for some minutes. For the second attempt to run the pressure up, the bolts were set up with a very heavy wrench, which undoubtedly put a bending moment on the flange. The fitting finally parted all around the root of the flange at a pressure of 1,500 lbs. per sq. in.

Four test pieces were cut from the larger T and broken under tensile stress. Their dimensions were almost exactly ¾ in. in diameter by 6 in. between fillets. Two of them were broken cold and gave a tensile strength of 22,150 lbs. per sq. in., and two were broken at a temperature of 590° at 20,050 lbs. per sq. in. The temperature of the latter was maintained by means of a cylinder oil bath, the oil being placed in a large tube surrounding the test piece and kept hot by a gas flame.

No information could be obtained as to the original strength and chemical composition of the iron, and it would be impossible to prove that it had changed either in strength or in composition. There is ground, however, for believing that it had changed, as the smaller T mentioned gave as high as 28,000 lbs. tensile strength in one specimen.

A comparison of the larger T with those tested and reported in the *Valve World* for November, 1907, throws air interesting light on the subject. The formula there published as derived from a very large number of tests of cast iron and ferro steel fittings may be taken as a basis for calculating what should have been the bursting pressure of the 14-in. T.

$$\text{This formula is } B = \frac{T}{D} \times S, \text{ where}$$

D = inside diameter of the T
T = thickness
S = tensile strength of the material multiplied by 60%
B = bursting pressure in pounds per square inch.

Taking the tensile strength of the cast iron when hot at 20,000 lbs. per sq. in., the diameter of the T at 14 in. and the thickness at 1¼ in., the value of B is 1,070 lbs. per sq. in., whereas the T actually burst at 1,650 lbs. This did not seem to indicate weakness or deterioration.

It is interesting to inquire here what stress existed in the T during its service. That due to the steam pressure was small when compared with the actual bursting pressure, but that due to expansion may have been serious in its effect. The first T in the main steam line was located at 4 ft. 8⅝ in. from the anchorage, the second 37 ft. 8⅝ in., the third 70 ft. 8⅝ in., and there was no expansion joint to ease off the pressure on the vertical mains. Taking the third T for purposes of illustration, certain suppositions can safely be made:

The lower flange of the vertical pipe moves in a horizontal plane as the main pipe expands and therefore the lowest point of the axis of the pipe moves parallel to itself.

The upper end of the vertical pipe is practically fixed. The expansion of the main steam pipe thus puts an S bend in the vertical pipes and introduces large bending movements into both ends of it and into the T. The actual length of the pipe between its lowest flange and the upper end is 26 ft., but the length between the upper surface of the T and the upper end of the pipe is about 28 ft.

The linear expansion of the main steam line is about 3 in. when heated to 578° F. The effect of this is supposed to be halved by cutting the pipe short and springing the flanges into place when making the joints. There is thus an initial deflection in the vertical pipe. This is overcome as the pipe is heated and carried as much farther on the other side.

The value of the deflection in the lower end of the pipe is then taken at 1.5 in. The formula for the maximum deflection of a beam fixed at one end and moved parallel to itself at the other end is

$$Y = \frac{WL^3}{12\,EI}$$

W = load in pounds or push of the horizontal pipe.
L = length in inches.
E = modulus of elasticity.
I = moment of inertia of the pipe.

The inside diameter of the pipe is 8 in. and its thickness is 0.322 in., giving the value of I = 72.5. E is taken at 30,000,000.

The equation for the deflection is then

$$1.5 = \frac{312^3\ W}{12.725 \times 30{,}000{,}000}$$

and W is found to be 1,288 lbs. Thus, if the expansion of the pipe is exactly split by cutting the main line short, the push on the lower end of the vertical mains is 1,288 lbs. The point of contrary flexure in the S bend of the pipe is about 179 in. above the junction of the offset of the T with its main body. The bending moment in the offset of the T is therefore 1,288 × 179 inch-pounds and the stress set up is

$$S = \frac{Mc}{I} = \frac{1{,}288 \times 179 \times 5}{290} = 3{,}975 \text{ lbs.}$$

While this calculation is not entirely reliable on account of the uncertainty as to the elastic curve of the vertical pipe, nevertheless it is a fair indication of the stress to be expected in this T when the temperature of the pipe reaches 578°. Furthermore, it is made under the supposition that the expansion of the pipe was lessened by an initial pull and that all the joints came exactly fair before setting up the bolts. It is easy to imagine how serious the stresses might have become under actual conditions of inaccurate fitting. The one element of splitting the expansion is very uncertain. The foregoing stress might easily have been doubled, resulting in pulling the T quite out of shape and in setting up internal strains certain to weaken the material in places.

Under such conditions, it was, and would generally be, wise to replace the cast iron T's with cast steel, which would yield more readily to expansion and which would be safer at much higher tensile stresses. The reason for the substitution ought not to be lost sight of in such a case, if cast iron is to be judged fairly. It is made because it is cheaper on the whole to replace the cast iron with steel rather than to put in expansion or slip joints. Perhaps the steel casting is also much easier to take care of than any form of expansion joint. The unreliability of cast iron in such a service has nothing to do with the case: it is merely that the design usually adopted for steam piping does not quite fit cast iron.

(*To Be Concluded*)

Advantages of Isolated Plants for Hotel Buildings

In an article on the advantages of isolated plants by P. R. Moses and published in *The Isolated Plant*, the author gives the following reasons why the isolated plant is an economic necessity in hotel buildings:

1. The demand for electricity is heavy because of the free use of light by guests and also in the back part of the house.

2. The plant is used 24 hours a day, 365 days per year, hence the fixed or capital charges per kilowatt-hour are low.

3. Steam is required for cooking, laundry and refrigeration, and the addition of an electric plant involves a comparatively small increase in the use of coal during 18 out of the 24 hours.

4. Skilled labor is required for care of elevators, heating and electric systems and other apparatus, and the addition of the electric plant usually involves low-priced helpers and frequently no increase whatever is made in the labor bill.

5. With a private or isolated plant electricity may be used freely not only for lighting, but for broiling, ironing, refrigeration, dish washing and other special applications, which are only advisable where current is extremely cheap. It must be remembered in this connection that additional kilowatt-hours with a private plant usually only mean additional coal, so the cost of additional kilowatt-hours may be safely reckoned at less than 1 cent each, provided these can be supplied without enlarging the plant.

6. All hotels have quantities of garbage and waste to be removed, and the addition of the boiler room ashes does not involve any annoyance.

7. The use of gas may be abandoned and electricity substituted. Gas is objectionable because it uses up the oxygen of the air, and also because of its heat and cost. There is also the added danger of fire due to open gas jets.

8. With a private plant in operation heat is available from the exhaust steam of the engines at all times, night and day, winter and summer, and every hotel man and hotel guest will appreciate the value of being able to turn on steam for an hour or so on cold May and June mornings.

9. From the point of view of safety against fire or elevator accident, the private plant offers many advantages.

In the first place, having high pressure steam pumping facilities always available may mean the difference between a paltry loss and total destruction by fire.

In the second place, if the plant is properly run, systematic and regular inspections will be required of the engineers, and careful inspection is the greatest prevention of fire or accident.

In the third place, a better class of engineers and mechanics is attracted to hotels with private plants, and this in turn brings better care of machinery and premises.

10. The renewal of incandescent lamps is about one-half as costly on the private plant service; because with central service at from 3 to 10 cents per kilowatt-hour only high efficiency short lived lamps should be used, while with private plants where 1 cent per kilowatt-hour is the maximum possible saving by cutting down the annual use, lower efficiency long lived lamps are advisable. Besides this feature, which in itself cuts the cost of lamp renewals in half, it is the custom in many hotels to reduce the voltage during the day, and under such conditions, the life of the lamps is greatly prolonged.

11. With a private plant the owner is entirely independent. He is not subject to trouble from street blow-outs, central station explosions due to excessively high pressures or failure of supply if electricity is obtained from far away water powers. He is not subject to arbitrary decisions and is free from the trouble of meter questions; in fact, he is master instead of servant.

An Interesting Method of Barn Ventilation

An automatic ventilating system for stables and barns is described by C. A. Cook, a Wisconsin agricultural engineer, and has been found to give good results. It is known as the King system. It consists of two sets of flues, one set to provide fresh air, while the other furnishes an outlet for the vitiated air.

The fresh air flues should be placed not more than 10 ft. apart and located in the exterior walls of the barn.

No fear of putting in too many inlets, since the greater the number the more effective the ventilation. The outlet may include one or more flues, but should be so located as to provide the quickest means of removing the foul air.

All stable walls and ceilings should be non-conductors of heat and cold, otherwise moisture will collect as frost in cold weather and drop as water in moderate weather.

In a station barn the flues for taking out the foul air are two in number, one midway in each side wall. These flues pass upward to the left, where they meet a central chimney.

There is also a ventilator flue opening from the ceiling into the bottom of the chimney for more rapid movement of air in hot weather to keep the stable cooler.

In winter this ventilator would sacrifice a large amount of warm air and the opening should be kept closed until the stable becomes too warm.

The central flue is 40 in. in diameter and rises 50 ft. above the floor. The lateral flues which join the main chimney are 18 x 24 in.

There are two objects in bringing the ventilator shaft near the floor. First, to remove the waste products of the lungs produced by breathing, as this foul air always settles near the floor and animals are compelled to breathe it with the impurities. Second, to dispose of the cold air in the winter rather than the warm.

The walls of the barn are made of studding, sheeted up both inside and out with matched lumber and building paper. Several of the spaces between the studding are used for fresh air flues.

In constructing the flue the lumber should be nailed closely, covered with paper, and after the paper a second thickness of lumber. This will insure proper air capacity, as it increases the friction of the moving air in the flue.

A good ventilating flue must have the same qualities as a good chimney. It should rise above the highest part of the roof so as to receive the full force of the air and wind.

The best location of the foul air flue, when only one is used, would be in the center of the barn. If two flues are used place one on each side of the middle of the stable.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

Ballot for New Officers

The following names have been selected by the nominating committee for officers and governors of the society for the ensuing year. The result of the ballot will be announced at the society's annual meeting in January:

For president, Prof. J. D. Hoffman, Purdue University, Lafayette, Ind.; August Kehm, Chicago.

For first vice-president, Reginald Pelham Bolton, New York; Burt S. Harrison, New York.

For second vice-president, Samuel R. Lewis, Chicago; Prof. John R. Allen, University of Michigan, Ann Arbor, Mich.

For secretary, William M. Mackay, New York; Samuel C. Barter, New York.

For treasurer, U. G. Scollay, Brooklyn, N. Y.; T. B. Cryer, Newark, N. J.

For board of governors: Prof. R. C. Carpenter, Cornell University, Ithaca, N. Y.; W. Nelson Haden, Trowbridge, Eng.; Judson A. Goodrich, New York; James Mackay, Chicago; George W. Barr, Philadelphia; John F. Hale, Chicago; Bert C. Davis, Kansas City, Mo.; Fred. R. Still, Detroit, Mich.; Jas. H. Davis, Chicago; William K. Downey, Milwaukee.

New Committees on Atmospheric and Mechanical Vacuum Heating Systems

President William G. Snow announces the following committee appointments, which were provided for in a resolution adopted by the society at its summer meeting in Indianapolis, on motion of James A. Donnelly, of New York:

Committee to collect data on atmospheric heating systems, George D. Hoffman, Chicago; D. F. Morgan, Chicago.

Committee to collect data on mechanical vacuum heating systems, Albert B. Franklin, Boston; A. M. Feldman, New York.

Committee on Publicity

The committee on publicity, which originally consisted of Samuel R. Lewis, Chicago; O. Badger, New York, and Ed. K. Munroe, Baltimore, has been enlarged to include a member from each state in which the society is represented. The appointments, made by President William G. Snow, include the following:

Alabama—F. H. Chisholm, Birmingham.

California—Thos. Morrin, San Francisco.

Colorado—H. H. Fielding, Denver.

Connecticut—W. D. Clark, Willimantic.
Dist. Columbia—Edw. L. Stock, Washington.
Illinois—W. L. Bronaugh, Chicago.
Indiana—Theo. Weinshank, Indianapolis.
Iowa—F. E. Baker, Oskaloosa.
Kansas—W. C. Bryant, Holton.
Kentucky—F. A. Clegg, Louisville.
Louisiana—A. Aschaffenburg, New Orleans.
Maryland—Henry Adams, Baltimore.
Massachusetts—J. W. H. Myrick, Boston.
Michigan—Ralph Collamore, Detroit.
Minnesota—L. A. Larsen, Duluth.
Missouri—Jas. M. Kent, Kansas City.
Nebraska—Geo. H. Wentz, Lincoln.
New Jersey—Geo. W. Knight, Newark.
New York—Melvern F. Thomas, New York.
Ohio—O. H. Schlemmer, Cincinnati.
Oregon—W. G. McPherson, Portland.
Pennsylvania—J. E. McGinness, Pittsburg.
So. Dakota—Chas. D. Symms, Sioux Falls.
Texas—E. N. Green, Houston.
Virginia—E. C. Wiley, Lynchburg.
Washington—W. L. Bowers, Spokane.
West Virginia—J. R. Shanklin, Charleston.
Wisconsin—John S. Brennan, Milwaukee.

Proposed Amendment Regarding the Publication of Papers

A proposed amendment of the society's constitution defining the duties of the publication committee, has been proposed and has been submitted to the membership for mail ballot. It reads as follows:

"The publication committee shall receive and examine all papers for presentation to the society, and accept for publication such as it may approve. It shall publish [during each year] the proceedings of the society containing the papers and discussion so approved, and an abstract of the minutes of the society and board of governors." Such publication committee shall have charge of the papers approved by said committee until their publication in the proceedings, and when a paper is approved for presentation at a meeting, it shall afterward be subject to revision only, and not to rejection.

The words "during each year," enclosed in brackets, are old matter which is to be left out. The portion beginning, "such publication committee," is new matter.

The following reasons are presented why this change is desirable:

The proceedings of the society have never yet been published during the year in which they were presented. It may be possible for the publication committee to publish them as quickly as the constitution calls for, and this, of course, would be desirable, but as this clause has been ignored in the past, it is thought that it would be better to eliminate it from the constitution.

It is believed that our publication committees are competent to pass upon papers, and that when papers are passed upon by them and the society put to the expense of making cuts and printing them, that each member has a property interest in such papers, and that these papers should at least be noted in the proceedings by their titles and an abstract from them.

If a surplus of papers is presented, still it is thought that there will always be room in our proceedings for the before mentioned title and abstract of their contents.

Finally, it is believed that such an amendment as this will be for the best interests of the society, in safeguarding the rights of the authors of the papers presented, and in promoting harmony at our meetings.

In a letter accompanying the ballot and signed by all of the officers and board of governors, they state that they have carefully considered this subject and hold the opinion that the present constitution under which the society has worked successfully for so many years amply protects its interests and those of its members. As bearing on the matter, the letter quotes the practice of The American Society of Mechanical Engineers, which gives its publication committee the discretion to omit the publication of any papers it finds unsuitable for publication in the transactions.

November Meeting of the Illinois Chapter

At the November meeting of the Illinois Chapter, held November 8 in the rooms of the Western Society of Engineers, Paul P. Bird, chief smoke inspector for the city of Chicago, read a paper continuing his discussion of smoke prevention in cities.

NATIONAL ASSOCIATION OF MASTER STEAM AND HOT WATER FITTERS

Result of Investigation of Vacuum Heating Patents

As the result of a long and careful investigation of vacuum steam heating patents conducted by the National Association of Master Steam and Hot Water Fitters, official announcement is

made that "the basis of doing business will be materially changed by owners of some of the alleged vacuum (heating) patents." "Some of the manufacturers of vacuum (heating) specialties," continues the statement, "believe with us that 'time is up' on royalty charges."

The full results of the investigation are contained in a pamphlet which is being distributed to members only, the detailed information being withheld from the public, partly for the purpose of strengthening the association's membership. Much significance is attached, by many who have seen the report, to a reason given by the association's counsel for not making it public, to the effect that it might lead to legal complications. This has led some to characterize the report as an illegal document.

Readers of THE HEATING AND VENTILATING MAGAZINE will recall that in our issue for June, 1908, we referred, in an exclusive editorial announcement, to a pending investigation on the part of the association on the subject of vacuum steam heating patents. While no announcement was forthcoming at the time from the association on this subject, the investigation, nevertheless, was quietly commenced, being undertaken directly by the Committee on Trade Relations, employing, as special counsel, Francis T. Chambers, of Philadelphia.

The cause of the inquiry, it is stated, was that "certain vacuum heating interests making claims, threats and demands, have become most annoying in their attempts to harass not only the contracting steam fitters, but their customers as well." The outcome of the investigation is expected to be that "this course of procedure will cease."

Meeting of the Technical Publicity Association

The Technical Publicity Association held its second fall meeting on Thursday evening, Nov. 11, at the National Arts Club, 14 Gramercy Park, New York. There was an unusually large attendance at the informal dinner, which was followed by an interesting program. The feature of the evening was a spirited debate on the merits of special issues of technical and trade papers. Arguments were supplied by several men of national reputation in the technical advertising field.

Among the speakers were James H. McGraw, president of the McGraw Publishing Co., and J. George Frederick managing editor of *Printers' Ink*, who took the affirmative, and Robert Frothingham, advertising manager of *Everybody's Magazine*, who took the negative Other speakers were L. F. Hamilton, of the National Tube Co., and Mr. Carpenter, of Philadelphia.

A novelty was the vote taken by the members of the association at the close of the debate. All were asked to confine their balloting strictly to the merits of the arguments as presented. When the vote was counted it showed that 25 were opposed to special issues of trade journals and 10 in favor. One man voted "Yes, for real issues."

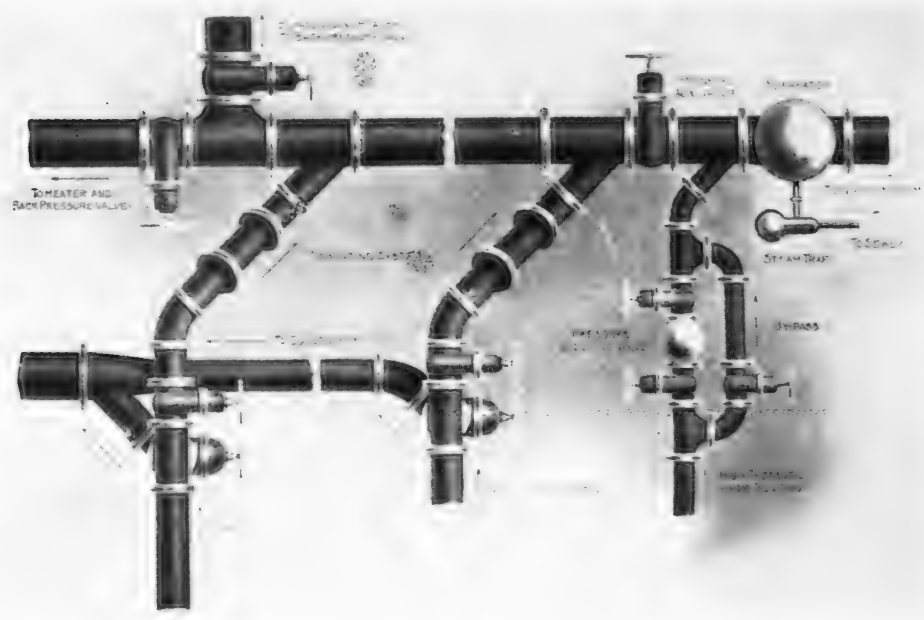
The Technical Publicity Association elected a number of new members at the meeting. In the absence of President Redeld, O. C. Harn, advertising manager of the National Lead Company, was toastmaster. Howard M. Post, chairman of the Publicity Committee, reported very satisfactory progress. He presented a portfolio of technical and trade paper comments, showing graphically the increasing recognition of the T. P. A. as a factor in the technical advertising field. The association, at the close of a very profitable evening, adjourned to meet again Thursday, Dec. 8.

Financial Effect of Combining an Exhaust Steam Heating System with an Electric Light and Power Plant is the title of a timely circular, known as Bulletin No. 115, published by the American District Steam Co., Lockport, N. Y. The principal feature of the circular are figures showing the results of the operation of a combination electric light, power and exhaust steam heating system. The figures include the heating season from Oct. 1, 1907, to June 1, 1908, and are given in round numbers. Under the heading of Revenue is included the sale of exhaust steam by condensation meter, amounting to $58,300; sale of 3,800,000 K.W.-hours (electric receipts not given). Under Generating Charges are given:

14,000 tons of coal, total used at plant	$34,000
Boiler and engine room labor, etc.	7,000
Cost of water	700
Total generating cost as above	$41,700

Other charges include meter reading and other labor chargeable to the heating system, $3,500; taxes on underground steam mains, $2,600, or a total of $47,800. Thus the surplus of heating revenue over total plant generating and other charges due to heating system is $10,500, which is equal to 5% on the investment in underground steam mains.

During the same period, other station charges incident to the manufacture of 3,800,000 K.W.-hours—such as oil, waste, packing, supplies, maintenance and repairs of boilers, engines, auxiliaries, piping, shafting and electric machinery—amounted to $4,900. There was also a charge of $1,800 for electric distribution labor—making a total additional charge against plant operation of $6,700. This amount, added to $47,800, total of above charges, makes a total of $54,500, which is $3,800 less than the heating income. It



TYPICAL PLAN ILLUSTRATING STATION CONNECTION WITH HEATING SYSTEM

should be further noted that the heating revenue has paid in addition every charge for generating and distributing 3,800,000 K.W.-hours as far as the station is concerned, as well as paying steam distribution labor and taxes on underground steam system.

In order that the full value of the heating system may be appreciated, the generation of an equal amount of current (3,800,000 K.W.-hours) by other means, should be considered particularly condensing stations of average size.

With coal costing $2.50 per short ton on the cars, it will be conceded ¾c. per K.W.-hour generating cost will represent a fair average for coal, water, boiler and engine room wages. Upon this basis of K.W. cost, there would be an expense of generating an amount of current equal to that made by the combined plant of $0.0075 x 3,800,000 equals $28,500. There should also be taken into account cost of condensing apparatus, transmission lines, etc., as in most instances it is necessary to locate a condensing plant some distance from the distributing center.

Theoretically, it would appear that it might be more profitable to utilize the additional amount of fuel consumed in the manufacture of electricity. As a matter of fact, this company is no doubt meeting their electric demand, and have greatly increased their net profits by supplying exhaust steam to fill a demand for heat. Even if there was a market for many times 3,800,000 K.W.-hours, the profit of $39,000 is not due to the sale of electricity, but to the sale of exhaust steam, and could still be realized by operating a part of the plant as at present, and produce the balance of the electric requirements with condensing apparatus. The degree of coördination of electric load with heating demand, assists in determining the degree of profit.

The report concludes with an interesting description of the general principle of operation and construction of a central station heating system, the subect being divided into two parts, one dealing with the generating plant and the other with the underground distribution system. Numerous illustrations accompany the text. Pp. 16. Size, 6 x 9 in. (standard). Printed for sectional filing.

"How to Keep Well" is the title of a series of directions compiled by the board of health and school board of Cincinnati which have been posted in all of the school buildings of that city. The topics included in the directions are air, food, exercise and rest, clothing and cleanliness. The precepts regarding air are as follows:

Fresh air and sunshine are necessary to good health.

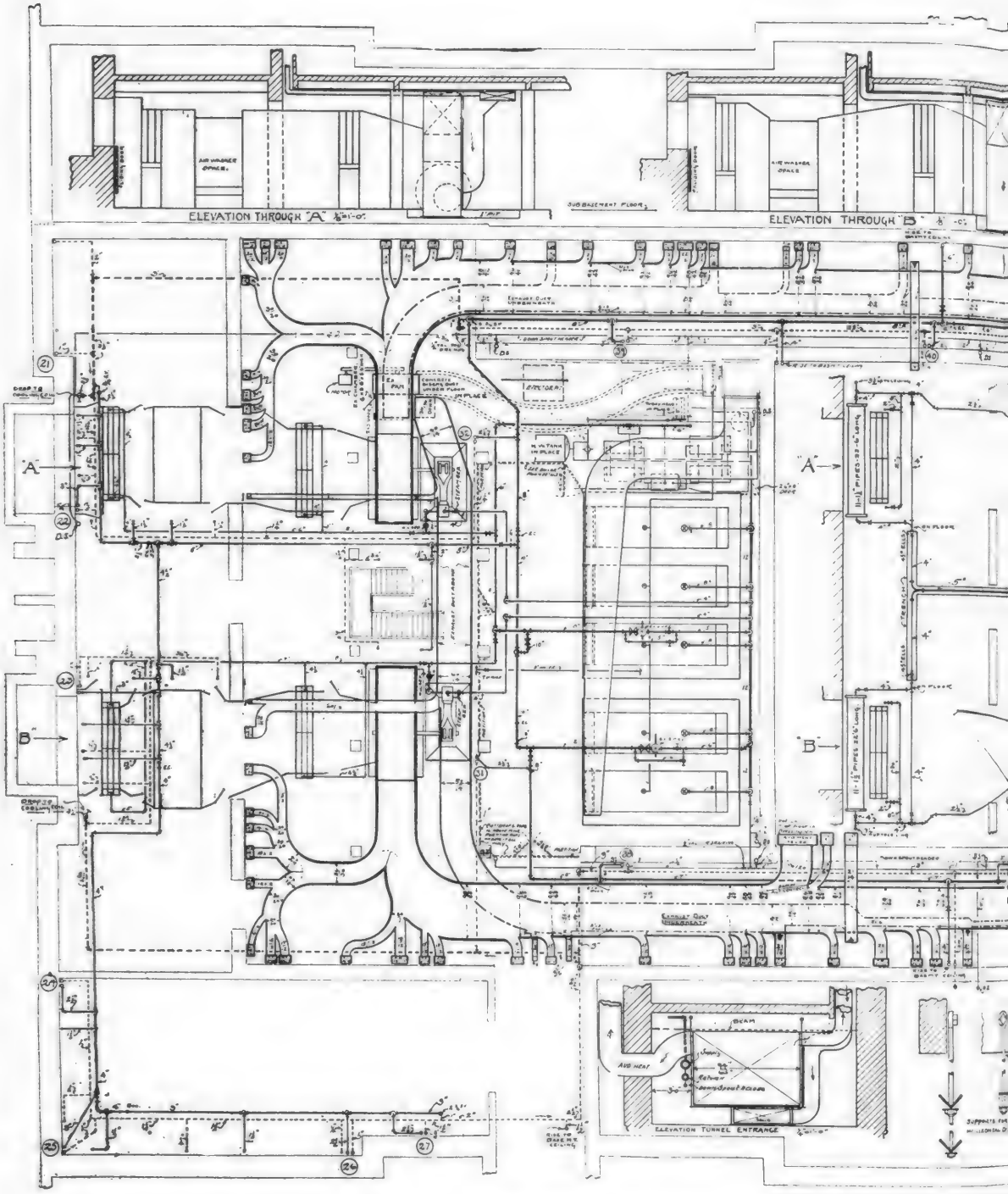
Cold or damp fresh air does not harm if the skin is kept warm.

Night air is as good as day air; breathe only through your nose.

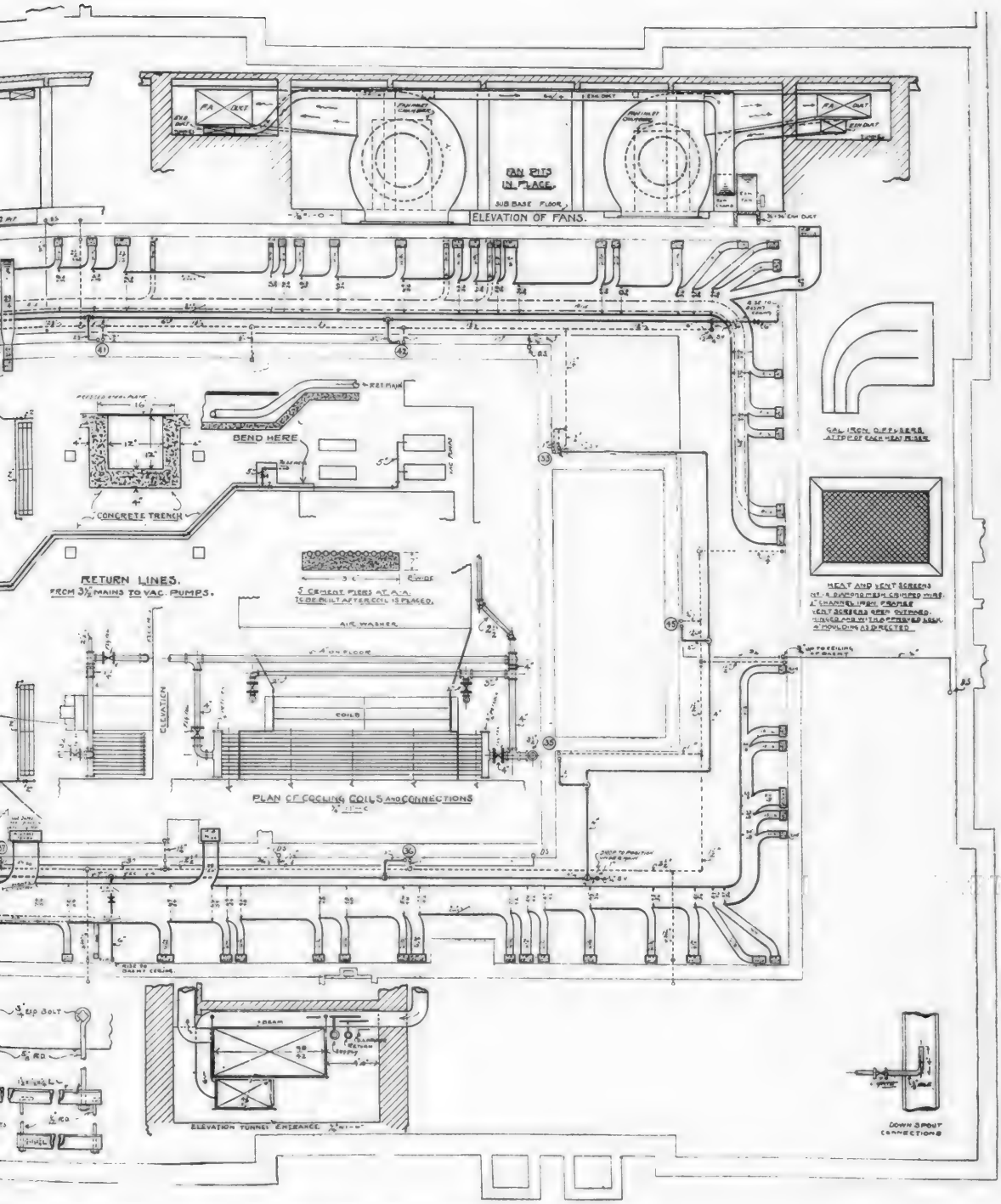
Avoid hot, crowded, dusty, dark, or damp rooms.

Let in fresh air and sunshine.

Form the habit of sitting, standing and walking erect; and of breathing deeply.



PLAN OF SUB-BASEMENT, WOODWARD HIGH SCHOOL BUILDING, CIN



INNATI, SHOWING DESIGN OF HEATING AND VENTILATING SYSTEM

THE HEATING AND VENTILATING MAGAZINE

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IT IS a very nice question how far a trade association is justified in confining the results of its work and the benefits of its activities to the immediate circle of its membership. On one hand, we have the argument that those who pay the freight, so to speak, should reap the rewards, and that modern commercialism does not pretend to have reached that altruistic state where the benefit of the greatest number has precedence over the interests of the few directly concerned. On the other hand, many men affiliate themselves with trade and similar organizations on the broad ground of being associated with movements for the general betterment of trade conditions, without anticipating or expecting any direct advantage to themselves beyond that accruing to the trade at large. Such men are looked upon as broad and liberal, the real leaders of association effort, whose membership is valued as giving the organization the prestige of conservatism and good sense which is always coveted.

While in some cases there are customs and practices that obviously have to do exclusively with the membership of an association, the class of men described, who form the backbone of an organization, would, as a rule, be the last to advocate the withholding of any information that would be of distinct service to the trade at large, that is, if such information in no way prejudiced, but rather enhanced, the prestige of their association. It is, no doubt, to be expected that an organization will often find it necessary to confine the knowledge of many of its proceedings to its members, yet in the case of a matter of general interest this course is always difficult to justify. We are not referring here to practices and information, which, if made public, might lead to legal complications.

While there is much to be said on both sides of the question, we think it a fortunate augury that American trade and engineering bodies are showing a growing tendency toward a fuller publicity as to their affairs, and that any movement in the other direction is, to say the least, considered unfortunate, and, if possible, to be avoided. Very often the actuating principle in such a course is the natural one of providing additional inducements for attracting prospective members. This, however, again depends on the point of view, for it frequently happens that the wider the knowledge of good work done, the wider is the influence and strength of the organization that accomplishes such work. Thus, while the advantages in a course of secrecy may seem very real and immediate, experience often shows that, as a far-sighted policy, publicity pays.

MECHANICAL EQUIPMENT

Is Alcohol the Coming Fuel for Internal Combustion Engines?

From two sources recently have come the results of exhaustive tests of alcohol and gasoline for internal combustion engines, and, while the use of alcohol is shown to be at present commercially impracticable, the possible rise in the market value of gasoline, as well as the limited nature of its output, would seem to furnish a strong indication of the future usefulness of alcohol for this purpose.

One of the tests referred to was made by the United States Geological Survey, under the technical direction of R. H. Fernald, at the government testing plant in St. Louis and at Norfolk, Va. The other tests were made by G. L. Guillet, of Montreal, Can., and are the subject of a paper read before the mechanical section of the Canadian Society of Civil Engineers, Nov. 11th, last.

The government tests dealt primarily with gasoline, forming part of the investigation of mineral fuels provided for by acts of Congress. To determine the relative economy and efficiency of gasoline it was compared with denatured alcohol. When the series of tests was started it was found that it took from one and one-half to two times as much alcohol as gasoline to produce a given power. With special alcohol engines, entirely suited to the use of alcohol, the latter fuel has been made to do as much work, gallon for gallon, as the gasoline.

On this point, the author of the government bulletin, Robert M. Strong, states: "By using alcohol in an alcohol engine with a high degree of compression (about 180 lbs. per sq. in. above atmospheric pressure—much higher than can be used for gasoline on account of preignition from the high temperatures produced by compression), the fuel consumption rate in gallons per horse-power per hour can be reduced to practically the same as the rate of consumption of gasoline for a gasoline engine of the same size and speed. The indications are that this possible 1 to 1 fuel consumption, ratio by volume, for gasoline and alcohol engines, will hold true for any size or speed, if the cylinder dimensions and revolutions per minute of the two engines are the same."

Some of the more important results and conclusions stated in this bulletin are as follows:

The low heating value of completely denatured alcohol will average 10,500 B. T. U. per pound, or 71,900 B. T. U. per gallon.

The low heating value of 0.71 to 0.73 specific gravity gasoline will average 19,200 B. T. U. per pound, or 115,800 B. T. U. per gallon.

The low heating value of a pound of alcohol is approximately six-tenths of the low heating value of a pound of gasoline.

A pound of gasoline requires approximately twice the weight of air for complete combustion as a pound of alcohol.

A gasoline engine having a compression pressure of 70 lbs., but otherwise as well suited to the economical use of denatured alcohol as gasoline, will, when using alcohol, have an available horse-power about 10% greater than when using gasoline.

When the fuels for which they are designed are used to an equal ad-

vantage, the maximum available horse-power of an alcohol engine having a compression pressure of 180 lbs. is about 30% greater than that of a gasoline engine having a compression pressure of 70 lbs., but of the same size in respect to cylinder diameter, stroke and speed.

Alcohol diluted with water in any proportion, from denatured alcohol, which contains about 10% of water, to mixtures containing about as much water as denatured alcohol can be used in gasoline and alcohol engines if they are properly equipped and adjusted.

When used in an engine having a constant degree of compression, the amount of pure alcohol required for any given load increases and the maximum available horse-power of the engine decreases with a diminution in the percentage of pure alcohol in the diluted alcohol supplied. The rate of increase and decrease respectively is such, however, that the use of 80% alcohol instead of 90%, or denatured alcohol, has but little effect upon the performance of the engine; so that if 80% alcohol can be had for 15% less cost than 90% alcohol and could be sold without tax when denatured, it would be more economical to use the 80% alcohol.

The relative hazard involved in the storage and handling of gasoline and denatured alcohol is of particular importance in considering their use as fuels for marine and factory engines and engines to be placed in the basements of office buildings, or in like places where a general fire would be likely to result from the accidental burning of the fuel stored or carried for immediate supply, or where the forming of explosive or inflammable mixtures of the fuel vapors and air in the immediate vicinity would be hazardous.

Very few alcohol engines are being used in the United States at the present time, and but little has been done toward making them as adaptable as gasoline engines to the requirements of the various classes of service. Engines for stationary, marine and traction service, automobiles, motor trucks and motor railway cars designed especially to use denatured alcohol have, however, been tried with considerable success.

The price of denatured alcohol is greater than the price of gasoline, and the quantity of denatured alcohol consumed by an alcohol engine as ordinarily constructed and operated is in general relatively greater than the quantity of gasoline consumed by a gasoline engine of the same type. Considerable attention is being given to the development of processes for the manufacture of alcohol from cheap raw materials which are generally available, and it seems reasonable to expect that the price of denatured alcohol will eventually become as low or lower than the price of gasoline, especially if the price of gasoline advances. It also seems reasonable to expect a greater general improvement in alcohol engines than in gasoline engines.

The tests conducted by Mr. Guillet were made on a Blackstone oil engine, and while they show a pronounced economy in favor of oil over ordinary alcohol and wood alcohol, due, however, in part, to the heavy tax imposed by the Canadian government on alcohol, the author makes deductions that are strikingly similar to those of the United States government experts.

"During the last few years," he says, "the possibilities of alcohol as a fuel for internal combustion motors have been brought before the manufacturers and owners of motors on many occasions. Gasoline, while now a fairly cheap and efficient fuel, will probably in the near future advance considerably in price. The rapid increase in its consumption, and the fact that, being a by-product of coal oil, its output is more or less limited, leads us to believe that very soon the market value will rise, and in consequence we shall be obliged to look for some other source of power which can be applied in its stead to internal combustion engines.

"Among the other fuels on the market, alcohol looks as promising as any. Its cost of production plus a reasonable profit should not exceed that of coal oil or gasoline, and the supply is practically unlimited. It can be produced in any quantity to meet the demand since raw material is plentiful. Then, again, the cost of production is quite likely to decrease as its use becomes more general."

The Selection of Vacuum Cleaning Outfits

In selecting a vacuum cleaning outfit of the stationary type, it is often the case that the capacity of the machine is given only nominally by the rated number of outlets. Thus, a thirteen-outlet set may be capable of operating only half that number of outlets at a time with good efficiency. Practical conditions also make the number of outlets that are actually in use differ from the rated capacity. Thus, under some conditions, the owner may find it advisable to put only a couple of men on the job, using one or two renovators at a time. At another time he may take advantage of a Sunday or holiday to put a gang of men on, and use a large proportion of the outlets. With any type of machine, the design of the pump should be such that the intensity of pull at the nozzle is constant, within practical limits, with variation in size of nozzle opening. Too powerful a pull or suction takes the nap off—especially from a dyed carpet, the fiber of which is weakened or rotted by the drying process. A demonstration should be made on the job.

An adequate volume of air, at just sufficient velocity to remove the dirt, is the criterion. The basis of comparison should be the amount of power required by the machine to maintain a given vacuum, in inches of mercury, shown when a renovator is in actual use, the test on each set being made with the same length and diameter of hose, the same cylinder displacement of pump in cubic feet of free air per minute, and the same area of slot in renovator. A good "vacuum engineering" performance for a stationary outfit, operated by a 2-H.P. motor, would be a 10-in. vacuum (equal to 5 lbs. of pressure per square inch) through a slot 12 in. x 9/32 in. (3⅜ sq. in. area of opening) at the end of a 100-ft. length of 1-in. hose.

With too strong a suction the dirt is effectually removed, but the goods is drawn up into the slot as well, and so pinched, crushed and distorted as to shorten its life; while with a weak suction the dirt is not thoroughly dislodged. These failings account largely for the bad impression of vacuum cleaning in general that has been caused by some of the irresponsible "wagon companies" which have exploited the system. The patrons of some of these concerns have found, to their sorrow, that a powerful suction, operating through a narrow nozzle opening, has pulled the very life out of embroidered upholstery, fine rugs, carpets, hangings, etc.

With either the portable or stationary type of machine, the manager can put in one or more units according to his immediate requirements and conditions; perhaps installing a single machine at first, and afterwards adding more machines, as they are needed, thereby keeping down his investment. This feature of flexibility of the unit system applies especially to the practice in our large cities of enlarging existing buildings, or tearing them down and putting up larger ones on the same site. The replacing of a six-story building by a twenty-story structure does not necessitate the throwing out of the existing vacuum cleaning outfit, but only the purchase of additional units to take care of the additional floor space. In machines employing rotary pumps, the maintenance is low—occasional lubrication, new carbon brushes for the motor, and a new length of flexible hose once in a while are all that are needed, with reasonable careful handling.

The hose, which is wire wrapped or otherwise armored to stand the pressure, will wear out in time—largely from the dragging about over floors and around corners—and have to be replaced. The hose does not wear on the inside; although cases of cutting through of brass elbows in permanent piping by the abrasive action of the grit have occurred.

In the use of stationary plants there is a tendency to clogging of the long horizontal runs of piping by the deposit of a portion of the dirt which is not carried cleanly through by the current of air. This dirt is liable to be greasy and wooly, and must be removed by a vigorous "blowing out" at intervals. Sometimes a flexible steel pipe auger, inserted at convenient elbow joints, is used to loosen the dirt.

The degree of humidity in the air has a marked effect on the operation of the system, the dirt being removed much more readily in dry weather, as might be expected. Most of the dirt collected by the machine is very fine, and strainers are provided to prevent clogging of the machinery by it. It is, however, inadvisable to have too many strainers in series, as the suction is thereby reduced. Bad clogging of the machine results from the use of too much or too heavy an oil, for lubricating the moving parts. The machine itself should be cleaned out fairly often for best results.

A variety of nozzle implements are usually furnished with the outfit, each of which has its special use. Thus, tools with plain slots of different lengths are

best for general work, while brush tools are effective for cleaning burlap walls, carved or stamped surfaces, and some kinds of upholstery. In a well-known New York office building (the Singer building), in which a large stationary plant is installed, and in which there are over 550 outlets, a separate coat and hat cleaning service is provided in the offices, comprising a small renovator which is operated by the tenant.

The points to consider in a vacuum cleaning outfit is a compact, well-built machine at moderate cost, that will give constant, positive suction; that may be started and stopped by simply turning an electric switch; that may be located in the cellar and installed in finished buildings without excessive labor cost, if of the stationary type, or that may be trundled about with minimum labor if of the portable type; and that requires a low minimum of attention, and operating expense to keep it in working condition; and lastly, that not only removes the dirt, but effectually disposes of it.—Joseph Baker, in *Building Management*.

An Apparatus for Softening Make-Up Water in Heating Plants

The apparatus shown in the accompanying photograph has been especially designed for use in connection with exhaust steam heating and drying plants where the make-up water requires softening. It is so arranged that the reagent is fed continuously in proportion to the inflow of make-up water, and suitable provision is made for the removal of the resulting precipitate from the water by sedimentation and filtration. A special feature is a by-pass which comes into play automatically in case the filter should be neglected and allowed to clog, thus insuring a supply of hot softened water to the boiler feed pumps at all times.

The apparatus here shown, which is made by the Harrison Safety Boiler Works, Philadelphia, also has attached to it the new surplus exhaust separator which has recently been devised by the same firm for use on heaters and receivers installed in connection with exhaust steam heating and drying systems. This separator differs from the Cochrane oil separator heretofore used on heaters made by this concern in being extra large, and in having an outlet at the top for passing the purified exhaust steam to the heating system direct, without need of an independent oil separator. Convenient valves are also provided for cutting off connection between the separator and heater, and between the trap which drains the separator and the heater, so that the heater body can be cut out of circuit and opened for cleaning and inspection while the heating system continues in operation. This does away with the independent oil separator and trap, and with the valves, tees and elbows required for its installation, cutting down the first cost of the plant and the space required, while increasing convenience of operation.

The makers guarantee for this apparatus that where it is operated in accordance with their instructions, hard scale will not form in the boilers, which can be washed out by means of water from a hose, and that the boilers will be entirely protected from corrosion. They also guarantee that water heated by exhaust steam that has been passed through

APPARATUS FOR SOFTENING MAKE-UP WATER IN HEATING PLANTS

the oil separator attached to the apparatus, or water condensed from the steam itself, will be entirely suitable for boiler feeding and other purposes.

In the apparatus here shown, the returns and treated raw water are mingled together in the sedimentation chamber and the whole volume is passed through the filter, but where the percentage of returns is large it may be advisable to give over the entire sedimentation and filtering capacity to the make-up water alone and to pass the pure condensed returns, after reheating, directly to the pump supply-chamber. This gives better results than if the two water supplies are mingled before treatment.

This apparatus is equally applicable in the case of surface condensing steam power plants where the condensate is utilized as boiler feed, in which case there is the large volume of condensate to be heated and a comparatively small volume of supplementary make-up water to be heated and softened. The apparatus can then be so arranged that the exhaust steam will first come in contact with the make-up water, insuring full temperature for the chemical reaction, before heating the vacuum pump discharge. This apparatus is designed to save a large part of the cost of separate feed water heater and water purifying system, and makes it possible to purify the small amount of raw water at a merely nominal cost. The driving off of air and gases from the feed water reduces to a certain extent the amount of gases to be dealt with by the vacuum pump, while the elimination of scale-forming matter from the water should obviate the gathering of scale upon and erosion of turbine blades.

A Simple Method of Distinguishing Wrought Iron from Steel

A writer in the *Brass World* gives the following formula for a solution for making an acid test to distinguish wrought iron from steel: water, 9 parts; sulphuric acid, 3 parts; muriatic acid, 1 part.

These acids are poured into the water and allowed to cool in a glass or porcelain dish. The test is made by immersing the samples in the solution for 15 or 20 minutes. After being rinsed and dried, the specimens, if iron, will show a series of fibers, with the slag interspersed between the fibers. Soft steel dissolves uniformly and without the fibrous structure found in wrought iron.

Commenting on this kind of a test, Mr. T. N. Thomson, principal of the School of Sanitary Engineering at the International Correspondence Schools, Scranton, Pa., writes, in response to an inquiry from us: "Wrought iron can easily be distinguished from steel by the acid test referred to in the article. It seems that the acid eats into the wrought iron more rapidly than it eats into the steel, particularly between the fibers, and the etching consequently is more pronounced in the iron than in the steel. This test simply corroborates the tests which I made some time ago in the International Correspondence Schools' building in Scranton, Pa., and which were presented to the American Society of Heating and Ventilating Engineers. It shows that the corrosion of steel is different from the corrosion of wrought iron, the steel being uniform and smooth as compared with the jagged, fibrous character of the wrought iron corrosion. It also shows, in a clear simple way, the reason why a piece of steel pipe should last longer than a piece of wrought iron pipe.

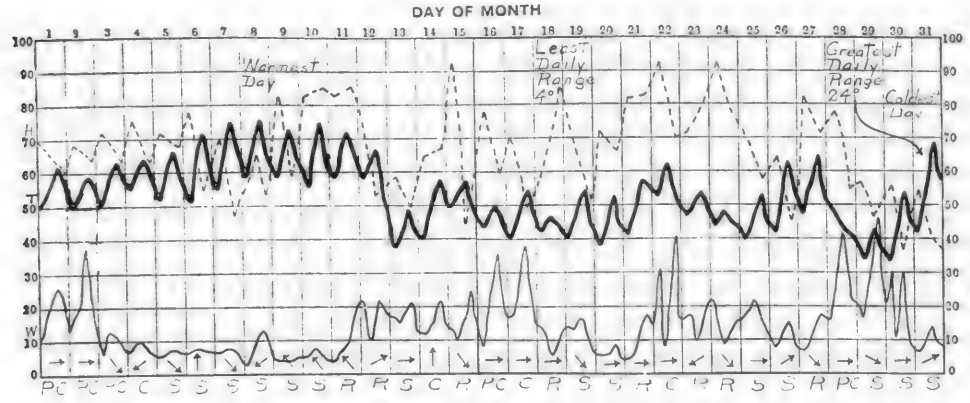
Perhaps you will remember that I found this to be the case in my tests. The steel pipe samples were not pitted as deeply as the wrought-iron pipe samples (the depths of the pittings being measured with micrometers to the thousandth part of an inch). The difference, however, in favor of the steel—as far as corrosion by that process was concerned—was so slight that I would consider good steel pipe to be at least equal to modern wrought-iron pipe in durability."

The Moon and the Weather

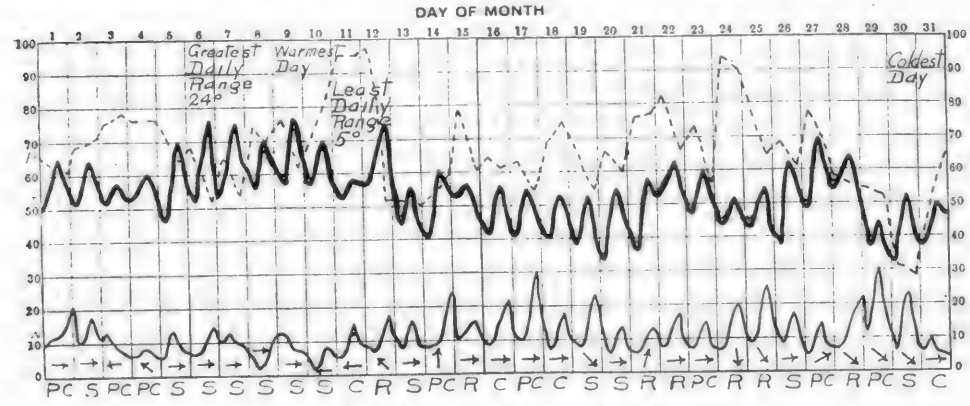
In an address of more than usual interest, delivered at the Meteorological Society by Mr. Richard Inwards, the president, the numerous fallacies which prevail with respect to the weather were exposed. The moon is very generally supposed to have a direct influence upon the weather; but as Mr. Inwards shows, the influence is merely supposititious. As long ago as 1774, Dr. Horsley examined the weather tables of that year as furnished by the Royal Society, and out of forty-six changes of weather only ten occurred on days of lunar influence, only two of them being at the new moon, and none at all at the full. As a result of twenty years' observation, M. Flarguergues, of Viviers, found that the barometer readings, taken when the moon was farthest from the earth, averaged 755 millimeters, and when nearest, 754 millimeters, showing a difference of 1 millimeter, or .04 in., and this in a direction against the theory, the pressure being greater by that amount when the moon was farthest from the earth. The cycle theory, such as that advocated by Mr. MacKenzie, and more recently by Mr. Hugh Clements, has, we are told, broken down, and there is no definite period after which the weather changes repeat themselves. The moon's influence on the weather is negligible, M. Flammarion tells us, and the ideas that the full moon clears away clouds, that beans should not be sown or trees cut down on the wane of the moon, that two full moons in a month will cause a flood, or that to see the old moon in the arms of the new one brings rain, are all, to use an expressive phrase, mere moonshine. They are not only not supported by scientific observation, but are opposed to observed facts. The heat reaching us from the moon would only affect our temperature by twelve-millionths of a degree, and the atmospheric tides caused by the moon would only affect the barometric pressure by a few hundredths of an inch—a quantity far less than the changes which are always taking place from other causes. Even the influence of the halo round the moon has been discredited, for observation shows that it is as often followed by fine weather as by rain.

The Weather for October, 1909

	New York	Boston	Pittsburg	Chicago	St. Louis
Highest temperature, degrees F.	75	77	80	76	87
Date of highest temperature	8	9	10	9	3
Lowest temperature, degrees F.	35	33	31	29	32
Date of lowest temperature	30	30	13	13	12
Greatest daily range, degrees F.	24	24	34	24	30
Date of greatest daily range	31	6	8	30	22
Least daily range, degrees F.	4	5	3	4	6
Date of least daily range	18	11	24	18	10
Mean temperature for month, degrees F.	53	53	50	51	56
Corresponding mean temperature for 39 years, degrees F.	55	53	55	53	59
Total precipitation, in.	.74	1.07	2.36	1.20	3.40
Average precipitation for 39 years, in.	3.58	3.76	2.34	3.02	2.33
Total wind movement, miles	9396	7414	7320	10903	7474
Average hourly wind velocity, miles	12.6	10	9.8	15	10
Prevailing direction of wind	West	West	West	West	S. E.
Number of clear days	15	12	9	9	17
Number of partly cloudy days	8	12	12	12	8
Number of cloudy days	8	7	10	10	6
Number of days on which rain fell	8	7	5	5	11
Number of days on which snow fell	0	0	0	0	0

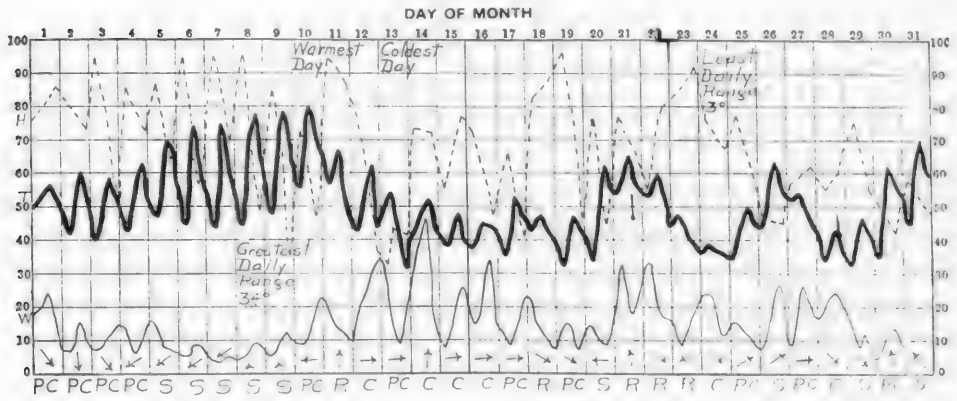


RECORD OF THE WEATHER IN NEW YORK FOR OCTOBER, 1909



RECORD OF THE WEATHER IN BOSTON FOR OCTOBER, 1909

Plotted from records especially compiled for THE HEATING AND VENTILATING MAGAZINE by the United States Weather Bureau.
Heavy lines indicate temperature in degrees F.
Light lines indicate wind in miles per hour.
Broken lines indicate relative humidity in percentage.
S—clear, C—partly cloudy, C—cloudy, R—rain, Sn—snow.
Arrows fly with prevailing direction of wind.


DAY OF MONTH
Warmest Day
Coldest Day
Least Daily Range 3°
Greatest Daily Range 32°
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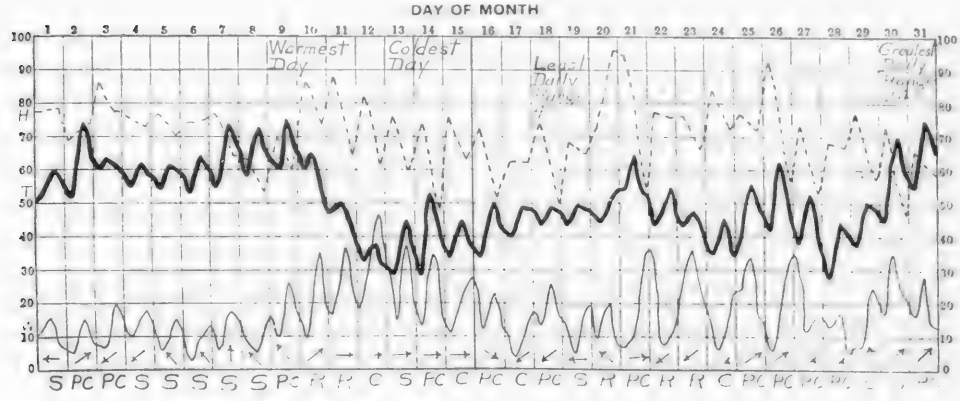
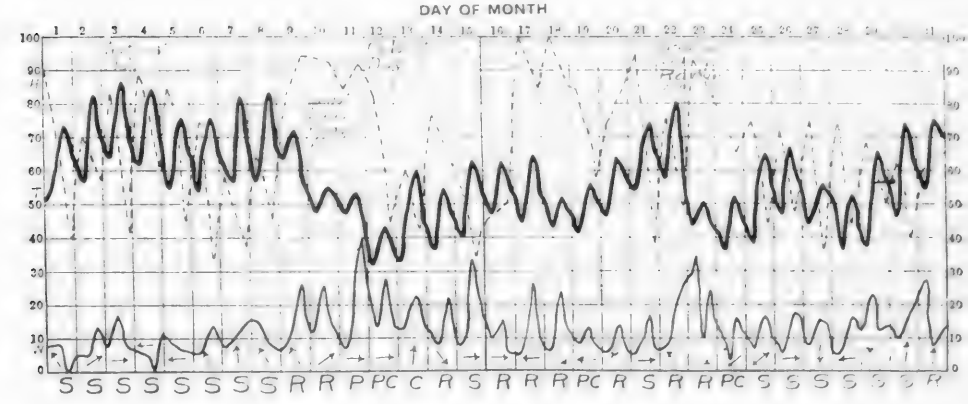
RECORD OF THE WEATHER IN PITTSBURG FOR OCTOBER, 1909



RECORD OF THE WEATHER IN CHICAGO FOR OCTOBER, 1909



RECORD OF THE WEATHER IN ST. LOUIS FOR OCTOBER, 1909

Plotted from records especially compiled for THE HEATING AND VENTILATING MAGAZINE by the United States Weather Bureau.
Heavy lines indicate temperature in degrees F.
Light lines indicate wind in miles per hour.
Broken lines indicate relative humidity in percentage.
S—clear, P C—partly cloudy, C—cloudy, R—rain, Sn—snow.
Arrows fly with prevailing direction of wind.

Current Heating and Ventilating Literature

Under this heading is published each month an index of the important articles on the subject of heating and ventilation that have appeared in the columns of our contemporaries. Copies of any of the journals containing the articles mentioned may be obtained from THE HEATING AND VENTILATING MAGAZINE *on receipt of the stated price.*

CENTRAL PLANTS

Engineering Aspects of District Steam Heating. H. C. Eddy. Considers the factors involved in the profitable development of district heating. 2,000 w. Elec Wld—Oct. 7, 1909. 20c.

Heating Buildings in Groups by Contract in Chicago. Illustrated description of the methods of the Illinois Maintenance Co. 2,000 w. Elec Wld—Oct. 7, 1909. 20c.

FANS

Electric Fans: Their Use and Abuse. Results of investigations into the action of small ventilating fans on the purity of the atmosphere. 1,500 w. Elec Engr, Lond—Oct. 1, 1909. 40c.

HOT-WATER HEATING

Calculation of Pipe Sizes in Gravity Hot-Water Heating. (Berechnung der Rohrweiten bei Schwerkraftwarmwasserheizungen). H. Recknagel. An elaborate discussion, with many tabular data. Ills. Serial. 1st part. 9,000 w. Gesundheits-Ing—Sept. 4, 1909. 60c.

PIPE CORROSION

Electrolysis of Iron Pipe. F. P. Siebel. Considers particularly the pitting of iron pipe, its causes and possible prevention. Ills. 3,000 w. Ice & Refrig—Oct., 1909. 40c.

STEAM HEATING

Steam Heating in Connection with Central Stations. Abstract of a paper presented at the Penn. Elec. Assn. convention, discussing district heating from electrical plants. 1,500 w. Elec Wld—Oct. 7, 1909. 20c.

Heating and Ventilation in the Ford Building, Detroit. An 18-story steel-cap building, receiving its steam, electric, compressed air and refrigerating service from an outside source. 1,800 w. Eng. Rec—Oct. 16, 1909. 20c.

Lower Temperatures Ordered for New York's Public Schools

Dr. C. Ward Crampton, director of physical training in the New York public schools, has sent out a general notice to school teachers, ordering them to keep the temperature in the school rooms lower. Heretofore the temperature has been kept at 70°. After this it will stand at 68°.

The thermostatic arrangements in the new schools are such that an even temperature can now be maintained. It is likely that a further general reduction will follow. In England the school rooms are kept at a mean temperature of 60°.

"The reasons for ordering this reduced temperature," said Dr. Crampton, "is because our scholars will do better work. The cooler the air in the school room the purer it will be, and also the heads of the pupils will be clearer. We shall observe closely the effect of this change of 2° before going any further."

National District Heating Association

The first annual meeting of the National District Heating Association was held at the Southern Hotel, Columbus, Ohio, November 10 and 11. This organization is an outgrowth of a movement started early in the year by members of the Ohio Electric Light Association and the nucleus of its membership is made up of Ohio engineers interested in central station heating. The association, however, is national in its scope and its object, according to the constitution adopted, is:

"To foster and promote the common interests of members, to advance the scientific and practical knowledge in all matters relating to hot water and steam heating, especially district or central station heating; also to establish cordial and beneficial relations with kindred associations and between manufacturers of heating equipment and appliances and installers of same and the members of this association."

The papers read include: "The Venturi Meter and Its Uses," by C. G. Richardson, of the Builders' Iron Foundry, Providence, R. I.; "The Determination of Deterioration in Underground Heating Mains," by Prof. W. A. Knight, Ohio State University, Columbus, O.; "Thermostats and Thermostatic Action," by W. E. Taylor, Toledo, O.; "Air Leakage Around Windows: Its Prevention and Effect on Radiation," by Harold McGeorge, Cleveland, O.; "Advantages of Steam Heating to Electric Generating Companies," by W. J. Kline, Lockport, N. Y.; and "Heating and Ventilation," by H. W. Woodward, Cleveland, O.

The election of officers at the last session resulted in the following choice:

President, A. C. Rogers, Toledo Railways and Light Co., Toledo, O.; first vice-president, J. H. Harding, La Porte Electric Co., La Porte, Ind.; second vice-president, H. W. Hillman, Grand Rapids-Muskegon Power Co., Grand Rapids, Mich.; third vice-president, F. E. Reidhead, Paducah Light & Power Co., Paducah, Ky.; secretary-treasurer, D. L. Gaskill, Grenoble, O., Ohio Electric Light Association; executive committee, Grant Miller, Citizens' Lighting & Heating Co., Toledo; W. A. Wolls,

Columbus Railways & Light Co., Columbus..

It was arranged to hold the next meeting in Toledo in May, 1910.

The following signed the register at the various sessions:

A. C. Rogers, Toledo, O., Railways & Light Company.

A. P. Biggs, Detroit, Mich., Central Heating Company.

H. W. Hillman, Grand Rapids, Mich., Grand Rapids-Muskegon Power Company.

A. L. Bailey, Penn Yan, N. Y., Penn Yan Steam Heating Company.

Robert Hett, Toledo, Ohio, Electric Heating Company.

F. E. Reidhead, Paducah, Ky., Paducah Light & Power Co.

G. M. Clapp, Middletown, Ohio, Washington Power & Electric Company.

E. P. Sawyer, Pittsburg, Pa., Best Mfg. Company.

W. H. Harrell, Chicago, American Radiator Company.

J. H. Harding, La Porte, Ind., La Porte Electric Company.

J. W. McNamara, Detroit, Mich., Central Heating Company.

George D. Higgins, Detroit, Mich., Murphy Heating Company.

E. C. Adams, Detroit, Mich., Anchor Packing Company.

F. A. Kohl, Detroit, Mich., Anchor Packing Company.

A. D. Spencer, Detroit, Mich., Central Heating Company.

R. M. Stackhouse, Chicago, Holland Radiator Company.

B. B. Gifford, Chicago, Central Station Engineering Company.

Harold McGeorge, Cleveland, Ohio, Metal Weather Strip Company.

Homer Whelpley, Cleveland, Ohio, Strong, Carlisle, Hammond Company.

P. S. Aultman, Springfield, Ohio, Springfield Light, Heat & Power Company.

T. L. Johnson, Columbus, Ohio, Columbus Railways & Light Company.

W. J. Kline, Lockport, N. Y., American District Steam Company.

C. R. Bishop, Lockport, N. Y., American District Steam Company.

F. C. Reeder, Knoxville, Tenn., Fulton Company.

Wm. E. West, Pittsburg, Pa., American Radiator Company.

Wm. E. Taylor, Toledo, Ohio, National Regulator Company.

M. W. Campau, Detroit, Mich., Central Station Steam Company.

C. H. Statler, New York, H. W. Johns-Manville Company.

A. A. Forhsee, New York, H. W. Johns-Manville Company.

A. N. Cope, Springfield, Ohio, Springfield Steam, Heat & Power Company.

H. C. Kimbrough, Chicago, Economy Heat & Electric Company.

C. C. Patton, Columbus, Ohio.

Joseph Graham, New York.

H. E. Hall, Cincinnati, Ohio.

Jos. H. Meyer, Detroit, Mich., the V. D. Anderson Company.

Chas. E. McFarlan, Cincinnati, Wm. Powell Company.

Chas. G. Richardson, Providence, R. I., Builders' Iron Foundry.

Prof. W. A. Knight, Columbus, Ohio, Ohio State University.

F. B. Dunlap, Birmingham, Ala., Birmingham Railway, Light & Power Company.

J. W. Jones, Canton, Ohio, Canton Electric Company.

D. L. Gaskill, Grenoble, Ohio, secretary Ohio Electric Light Association.

Geo. Senft, Coshocton, Ohio, Coshocton Light & Heat Company.

American Society of Mechanical Engineers

The thirteenth annual meeting of the American Society of Mechanical Engineers was held in the Engineering Societies Building, New York, December 7-10. The entire social programme was in charge of the members resident in and about New York, under the immediate direction of a local committee appointed by them, of which William D. Hoxie was chairman. Among the papers read at the professional sessions were the following: "Tests on a Venturi Meter for Boiler Feed," Chas. E. Allen; "The Pitot Tube as a Steam Meter," Geo. F. Gebhardt; "Efficiency Tests of Steam Nozzles," F. H. Sibley and T. S. Kemble; "An Electric Gas Meter," C. C. Thomas; "Tan Bark as a Boiler Fuel," David M. Myers; "Cooling Towers for Steam and Gas Power Plants," J. R. Bibbins; "An Experience with Leaky Vertical Fire Tube Boilers and the Best Form of Longitudinal Joint for Boilers," F. W. Dean; "Bituminous Gas Producer," J. R. Bibbins.

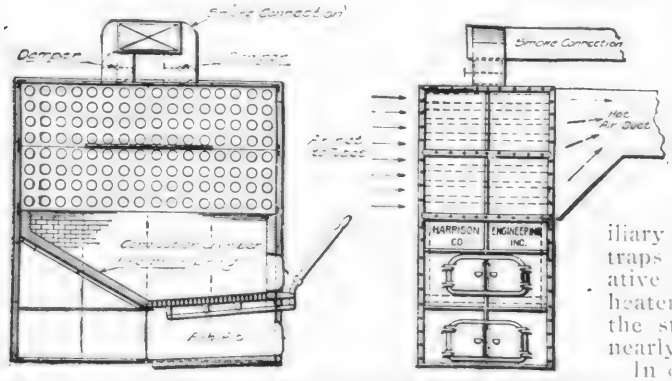
In addition to the papers read there were several valuable reports submitted by committees of the Gas Power section.

Feed Water Filtration, revised and enlarged, is being distributed gratis by James Beggs & Co., 109 Liberty St., New York. This book explains how oil, dirt, etc., get into feed water, what damage they do within the boilers, and how to remove such impurities before this can occur. It tells how water of condensation and returns from heating systems may safely be used to cut down the coal and water bills and it explains the advantages and disadvantages of various methods of filtration. Numerous instances are cited where filtration through terry cloth at the last point in the line before water enters the boilers has proven successful after other methods have failed. The Blackburn-Smith feed water filter and grease extractor is described in detail.

NEW DEVICES

A New Method of Heating

A new air heater that, in many ways, revolutionizes heating methods has recently been placed on the market by the Harrison Engineering Co., 42 East 23d street, New York. It is known as the Harrison air tube heater and is the invention of Burt S. Harrison, a well-known heating and ventilating engineer, who is at the head of the new concern.



SECTIONAL VIEWS OF HARRISON AIR TUBE HEATER

The Harrison air tube heater is designed to take the place of the boiler, feed pump, feed water heater, steam coils, traps and steam piping. In addition, it eliminates all danger, for there is no water or steam to blow up or freeze up; no expensive licensed engineer is required.

Everyone admits the good results obtained from the fan system with its steam heater, and its all round satisfaction in large buildings. The Harrison method is a fan system with all these advantages—the effort is the same, but its distinctive feature is a furnace and heater which warms the air direct instead of through the medium of water or steam. As in other fan systems, the quality and quantity of air are easily controlled, and the action of the system is positive under all atmospheric conditions.

It has the further advantage of flexibility, for in warm weather a low fire may be carried, whereas with a steam heater the water must be raised to at least 212° before heat can be imparted to the air passing through the coils. With a Harrison heater no water is used for heat transmission.

The Harrison air tube heater is built like a sectional water tube boiler, except that instead of water circulating through the tubes by gravity, air is passed through the tubes at high velocity, under pressure from a fan.

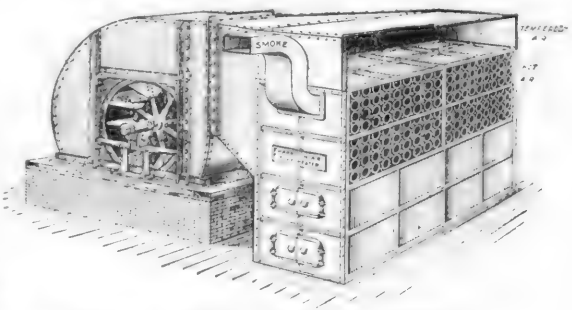
The air tubes and casings are built of cast iron, with patent joints between the tubes and the tube sheets, and between the different plates of the casing, which allow of expansion and contraction of each individual part of the heater, without allowing any leakage of the gases of combustion into the air.

The tubes are 4 in. in diameter, 4 ft. long, supported at each end and in the center.

The efficiency of the heater itself has been found from tests to be higher than that of the best water tube boiler operating under ideal conditions and at full load. When the efficiency of a boiler operating under 30% to 40% load factor, with the losses in mains, returns and auxiliary apparatus, steam coils and traps is considered, the comparative efficiency of the air tube heater plant as a whole against the steam plant as a whole is nearly two to one.

In operation, the Harrison air tube heater is fired exactly as a boiler. Stokers and mechanical draft can be applied equally as well on the heater as on a boiler. The heater can be fired up in thirty to forty-five minutes, while a boiler requires an hour at the very least. The heater responds quickly to regulation and can be controlled by thermostatic regulation on the draft and smoke dampers.

The fire may be drawn from a heater and within half an hour tubes can be taken out and replaced, the operation of replacing tubes requiring less than twenty minutes. An entire heater may be taken down and reassembled over night. When operated with stokers and with thermostatic control, one fireman can tend three or four heaters.

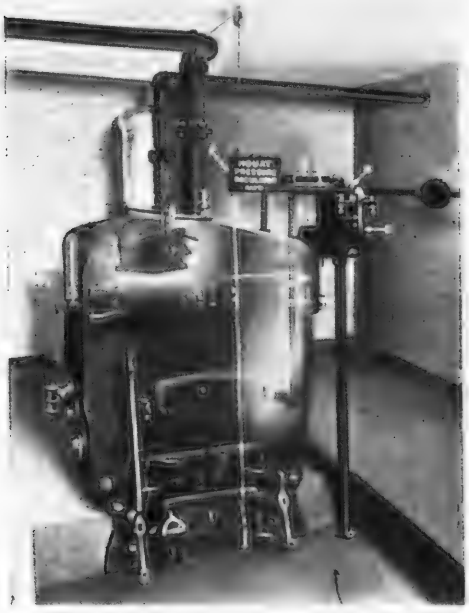


HARRISON AIR TUBE HEATER AS SET UP FOR OPERATION

This heater is now being manufactured on a large scale by the Harrison Engineering Co., and a number of installations have already been completed.

A New Boiler Pressure Regulator

An ingenious boiler pressure regulator, the invention of Thomas G. Mouat, of Cleveland, O., has lately been perfected and is now being manufactured and sold by the Mouat-Squires Co., the well-known heating and ventilating contracting engineers of Cleveland. The device



NEW BOILER PRESSURE RADIATOR, INVENTED BY THOMAS G. MOUAT

is illustrated herewith. In its operation the stationary receptacle A is first filled with water through the filling plug B, and is connected at the top with a pipe C from the steam space of the boiler, and an overflow pipe D to the water space of the boiler. When the pressure of vapor exceeds that at which the regulator is set to open, it forces the water down in the stationary receptacle A and up through the flexible connection E into the movable receptacle F, which is located at the end of the hollow lever H. This causes the movable receptacle F and lever H to tilt downward and close the damper I.

When the pressure decreases an ounce or so the water runs out of the movable receptacle F back into the stationary receptacle A, and the weight J causes the reverse operation of the lever and dampers to occur.

The working parts of the regulator are connected above the water line of the boiler and are not affected in any way by high water or the variations of an unsteady water line.

The regulator has already received the enthusiastic indorsement of the Cleveland heating trade, and the manufacturers have arranged to market the device on a large scale.

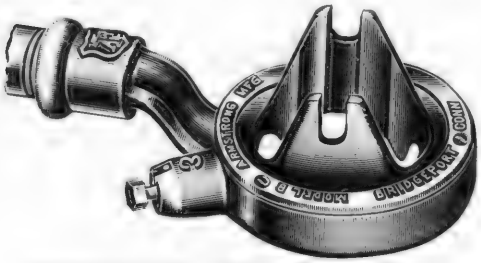
Draft Concentrator Firepot, the invention of P. J. Mooney, Brazil, Ind., is a novel application of the principles of combustion. This firepot is designed in the form shown so as to secure the complete combustion of soft coal and similar fuel. The round passage running up the side of the firepot, with one side exposed to the fire, is an air passage and is controlled by three dampers. The idea is to concentrate the draft into one air channel, obtaining the effect of a blast flame at the base of the fuel bed and in the coal resting against the air passage. The high temperatures thus secured are supposed to render the balance of the coal incandescent and smokeless. The air passage dampers are used to turn the updraft through the fuel when desired. The Draft Concentrator Firepot is made 4 ft.

DRAFT CONCENTRATOR FIREPOT

in depth, 16 in. in diameter at the top and 12 in. in diameter at the base. The air passage is 3 in. in diameter. Other sizes may be made with corresponding dimensions. Directions are published by the inventor for building the fire, and, by manipulation of the dampers, for securing either rapid or slow combustion, in either case without smoke.

A New Ratchet Attachment for Die Stocks

The accompanying illustration shows the new model B ratchet attachment which has been recently put on the market by the Armstrong Mfg. Co., Bridgeport, Conn. With this ratchet attachment applied to a genuine Armstrong stock an apprentice boy can cut pipe with ease.



NEW RATCHET ATTACHMENT FOR DIE STOCKS

It is not necessary to buy an extra stock when this attachment can be applied to stocks already in use. This attachment is now made to fit the genuine Armstrong stocks, viz.: Nos. 2, 2½, 3. The Nos. 1, 6 and 7 will be ready to market soon.

The manufacturers will gladly give any information desired in regard to this new and useful tool.

Handy Die Stocks are new pipe threading tools that are being marketed by the Handy Mfg. Co., 73 West Broadway, New York, and Bridgeport, Conn. They are described in a new catalogue published by the makers. Among the interesting features of this type of die stock is that it is self-contained, having one set of dies for all sizes in the stock. There are no loose parts or bushings and it can be used to cut right as well as left hand threads. The die stocks are made without leader screws, the construction being such that the dies and guide are held rigid without screws or nuts. Another point mentioned in its favor is that the stock can be released instantly by the hand without a wrench. It must be given a full turn backward before it can be released, which serves to clean the threads before the tool is removed.

Paragon Weather Strip, a device that may be applied to any window for keeping out dust, air, and rain, is made by the Noiseless and Draftless Door and Window Cushion Co., 511 West 21st Street, New York. The device is applied to the meeting rails where it is mortised into the sash bars, acting to prevent the window from rattling, as well as making it air tight.

A. & J. Floor Sleeve, made by the Mellish-Hayward Co., Chicago, for insulating steam pipes running through floors and partitions, and described in a folder giving views of the method of applying this device. The features of the A. & J. floor sleeve is that it is made on the telescope plan which admits of adjustments of from 12 to 24 in. The sectional illustration shows the position of ceiling plate and strap before ceiling is finished. The strap, which is riveted to the upper section of sleeve, allows the ceiling plate to hang below the plaster from 4 to 6 in. After the ceiling is properly finished, the plate, or lower section of sleeve, is adjusted in place, the strap cut to the proper length and formed around the lip of lower plate, thereby firmly holding sleeve in place. A price list is included on sizes ranging from ½ in. to 8 in.

Chamberlin Leakage Stop System, for preventing the leakage of air around windows, showing the effect of this system upon the air in rooms, is graphically presented in a circular prepared by H. W. Whitten, chief engineer of the Chamberlin Metal Weather Strip Co., Detroit, Mich., and superintendent of the Boston office. A novel idea is introduced most effectively in displaying in colors the dif-

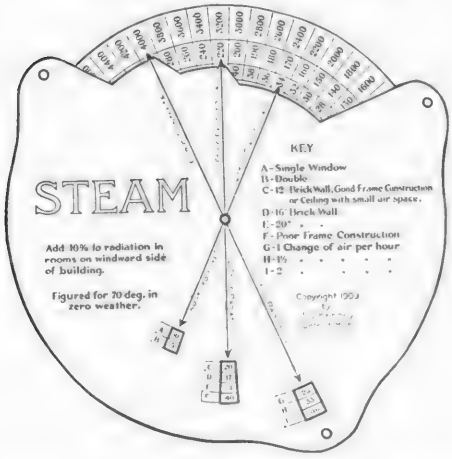
HANDY DIESTOCK

ferences in temperature in a room, red being used for high temperature, shading off to white for the cold spots. In one illustration, a room is shown as often heated with a temperature of 90° in the center and 60° around the windows. Another illustration shows in uniform color the even temperature of 70° obtained by the equipment of the windows with Chamberlin metal weather strips.

O'Meara's Patent Tubular Packing is a new product manufactured by J. O'Meara, 82-84 Centre Street, New York. It is made of a composition of plumbago and rubber. It comes in tubular form, 6 in. long, partly cut through, so that discs or washers can be cut from it for packing purposes.

Rapid Calculator is an ingenious device in the form of a slide rule for calculating steam and hot water radiation, published by the Kenney Co., Chamber of Commerce, Detroit, Mich. It is of

celluloid and well made for constant usage, its size, 5 in. in diameter, making it convenient for the pocket. The method of operating the slide rule may be seen at a glance. The figures on the dial are arranged in three rows, the outer row running from 350 to 5,000, indicating cubical contents of rooms. The center row, ranging from 10 to 400, indicates ex-


STEAM
KEY
A-Single Window
B-Double
C-12 Brick Wall, Good Frame Construction or Ceiling with small air space.
D-16 Brick Wall
E-20" " "
F-Poor Frame Construction
G-1 Change of air per hour
H-1½ " " " "
I-2 " " " "
Add 10% to radiation in rooms on windward side of building.
Figured for 70 deg. in zero weather.

RAPID CALCULATOR FOR FIGURING STEAM AND HOT WATER RADIATION

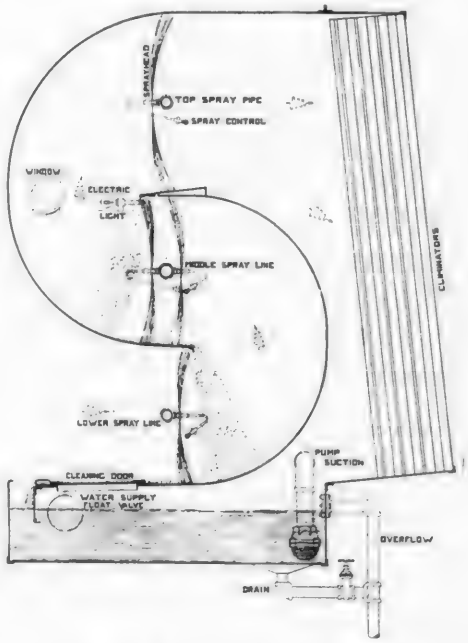
posed wall surface, while the inner row, running from 6 to 60, indicates glass surface. At the bottom of the slide rule the arrows point to openings giving the corresponding amounts of radiation to be provided, the letters showing the different forms of building construction, as explained in the key. One side of the calculator has the figures for steam while the other side has similar arrangement of figures for hot water. The Rapid Calculator is sold at $2.00.

New Design of a Well-Known Air Washer

An interesting step in the development of air washing devices is shown in recent modifications of construction of the McCreery air washer, made by the McCreery Engineering Co., Toledo, O. The company's new standard equipment is illustrated herewith.

Instead of carrying the air into the spray chamber from above, it is now drawn in from below and reversed in an upward direction against the fall of the spray water. The result is that a continuous supply of fine mist is developed within the casing, which has its value not only for cleaning, but also for cooling and humidifying. The improvement in cleaning efficiency is apparent by noting that there is less liability of dry spots to appear on the cleaning surfaces, where now a continuous film of moisture is kept flowing. The cooling and humidifying is intensified in the 1910 design, because of the denser and more divided character of the mist. Nothing is lost of the value of the former design, since the air still remains in prolonged, intimate contact with the spray. Three spray lines are used instead of two, and the impure and dusty air is first blown down upon the total volume of the spray water as it passes, in a miniature rapids, over the lowest curved deflector into the circulating tank. The self-cleaning adjustable spray head is retained, in which the flushing action is either spring or piston controlled.

The eliminators are L-shaped metal troughs of special design set vertically in staggered rows across the full height of the casing. This arrangement and the spacing used makes it possible to reduce the air velocity to a minimum within the eliminators instead of increasing it at this point, as is necessarily the case in the ordinary air washer design, where the air passes straight through the casing. There is, therefore, no spray carried into the



NEW TYPE OF McCREERY AIR WASHER IN WHICH DIRECTION OF AIR FLOW IS REVERSED

delivery ducts. In practice, with the air velocities adopted, free moisture is removed before reaching the last row of eliminators, which are practically dry and clean under examination during service.

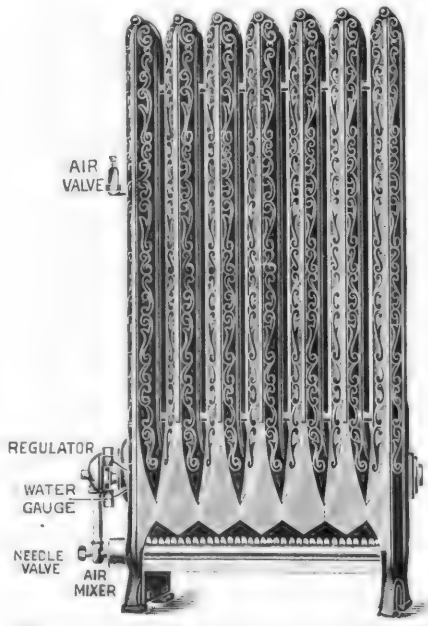
These air washers have no wide open ends from which splashing water can cover the floors. They are self-contained and water tight.

Self-Contained Air Cleaning and Cooling Equipment

With the increasing use of air washers in the heating and ventilation of buildings, the advantage of an apparatus embracing in a single unit, in addition to the washer itself, the fan and fan motor and the pump and pump motor, will be at once apparent. Such an equipment has just been gotten out by the McCreery Engineering Co., Toledo and Detroit, and is shown herewith. In this apparatus the manufacturers have mounted upon a single base, direct connected blower and motor, air washer and eliminator and circulating pump and motor. Nothing, therefore, is needed to complete the installation but the air duct work, together with electric and water connections. With this arrangement no outside floor space is required for the spray water pump and motor, and no pipe fitters or sheet metal workers need be called in to finish or erect the apparatus. The sub-base is built of plate and angles and contains the circulating tank.

This type of equipment is made in four sizes, with capacities ranging from 2,000 to 5,000 cu. ft. of air per minute. Special emphasis is laid on the small over-all dimensions for the air capacities given, these dimensions ranging from 6½ ft. x 5½ ft. x 2 ft. 7½ in. for the smallest size to 7½ ft. x 6 ft. 4½ in. x 4 ft. 7½ in. for the largest size.

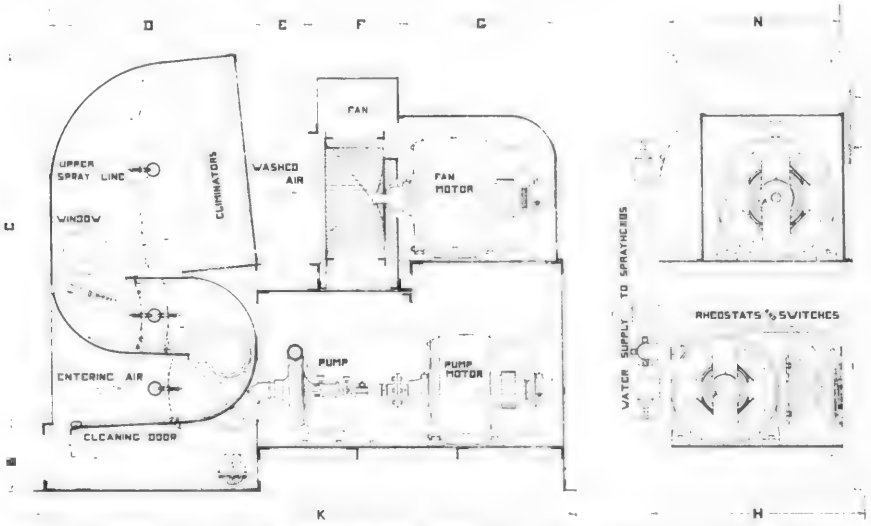
Gasteam Radiators, designed for use as an auxiliary to the heating system or serving for the exclusive heating equipment, are described in a new catalogue published by the manufacturers, James B. Clow & Son, 352 Franklin Street, Chicago. When used as an auxiliary the Gasteam radiator may be connected to the steam heating system in the usual manner. For independent use, the Gasteam radiator is filled with water, a special gauge glass being provided for the purpose, and it is then heated by gas



TWO COLUMN GASTEAM RADIATOR WITH TAPPING FOR STEAM CONNECTION TO BOILER IF DESIRED

from a special equipment, also provided. The flame is regulated automatically.

Joseph Dixon Crucible Co., Jersey City, N. J., whose products include the well-known Dixon's pipe joint compound, announce the appointment of John A. Condit as manager of a permanent branch the company has established at Buffalo, N. Y., located in the Erie County Savings Bank building.



McCREERY SELF-CONTAINED AIR CLEANING AND COOLING EQUIPMENT

TRADE AND MISCELLANEOUS NOTES

Coming Events

January 18, 19 and 20, 1910.—Annual meeting of The American Society of Heating and Ventilating Engineers, Engineering Societies Building, 29 West 39th street, New York. Headquarters at the New Grand Hotel, Broadway and 31st street, New York.

Deaths

Thomas J. Hayward, president of the Bartlett-Hayward Co., Baltimore, Md., heating and ventilating engineers and founders, died suddenly at his home in Baltimore, October 23. He was 62 years old. At an early age Mr. Hayward served his apprenticeship at the stove foundry of his father. In 1880 he purchased an interest in the Bartlett-Robbins Co., the firm name being changed to Bartlett, Hayward & Co. Mr. Bartlett died in 1905, and the company was incorporated last May. Mr. Hayward was active in the business life of Baltimore, being a director of several banks. He is survived by a widow and four children.

William L. Miller, president of the W. L. Miller Heating Co., Chicago, died November 28 at El Paso, Texas, of pneumonia. He organized the W. L. Miller Heating Co., in 1905, in company with his brothers, Charles and E. W. Miller.

Miscellaneous Notes

Saginaw, Mich.—The Chippewa River Power Co. has applied to the city council for a franchise for the installation of a central heating plant at that place.

Ottawa, Can.—The Metropolitan Electrical Co., Ltd., is seeking a franchise from the city board of control for a central station power and heating plant at that place.

Madison, Wis.—Present building operations at the State University involve a total cost approximating $472,000.

Crawfordsville Heating Co., Crawfordsville, Ind., has given a trust deed to the Crawfordsville Trust Co. covering all of its pipe lines, property and franchises, in order to enable the trust company to

ENGINEERS AND STEAMFITTERS REQUIRE GOOD TOOLS

The GENUINE ARMSTRONG Stocks and Dies are

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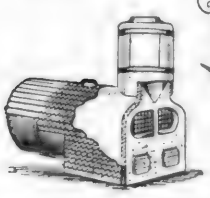

ESTIMATES FURNISHED AND CONTRACTS EXECUTED.

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HEADQUARTERS FOR 85% MAGNESIA, ASBESTOS AND BRINE PIPE COVERINGS, ASBESTOS PRODUCTS, ETC.

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issue $100,000 in bonds for the purpose of extending the heating plant.

Toronto, Can.—A project is on foot at Toronto University to build a central heating and lighting plant for the university buildings to cost $200,000. At present three of the buildings have separate lighting plants and the remainder take their current from the city lighting system.

Beaver Dam Light, Power & Heat Co., Beaver Dam, Wis., is erecting a heating plant at that place and is running heating pipes in several of the residence streets.

John Duncan, formerly assistant general manager of the National Tube Co., Pittsburg, has been appointed general manager of sales of the Wheeling Steel & Iron Co., Wheeling, W. Va., succeeding Henry G. Tinker.

John Anness, a veteran in the heating trade, having been connected with the Richardson & Boynton Co., New York, for the past 28 years, announces his retirement at the age of 77 years. He has been identified with the heating trade since he was a boy.

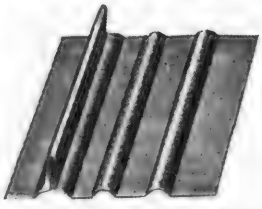
P. H. McCarthy, lecturer for the Federal Furnace League, organized to promote the scientific installation of warm air furnaces, has aroused much interest in the trade through a series of lectures he has been delivering in a number of New York State cities. Among the important points where Mr. McCarthy has spoken to large audiences are Newburgh, Nov. 15; Amsterdam, Nov. 17; Syracuse, Nov. 18; Rochester, Nov. 19; Oneonta, Nov. 20. Among the other cities where Mr. McCarthy has lectured recently are Harrisburg, Pa., Dec. 3; Midland Club, Chicago, Dec. 7; Erie, Pa., Dec. 9; Buffalo, Dec. 10; and Modern Science Club, Brooklyn, Dec. 14. He will also speak in Reading and Philadelphia.

Building operations for October from 45 representative building centers show an aggregate loss of 3%, as compared with the figures for October, 1908. The loss is caused by the lessened building activity in New York City of about $8,000,000 for the month. Among the cities showing a gain of over 50% are: Baltimore 168%, Buffalo 66%, Duluth 349%, Hartford 64%, Louisville 76%, Manchester 115%, Memphis 97%, New Haven 149%, New Orleans 293%, Oklahoma City 136%, Portland, Ore., 105%, St. Paul 86%, Syracuse 66%, Salt Lake City 257%. Twelve cities show a loss of from 3% to 84%.

Ohio Society of Mechanical, Electrical and Steam Engineers, at its annual meeting in Lima, O., Nov. 19-20, elected the following officers for the ensuing year: President, P. F. Rabbe, Toledo, O.; vice-president, Grant Miller, Toledo, O.; secretary-treasurer, Prof. F. C. Sanborn, Ohio State University, Columbus, O.; managers, Ira Cole, Lima, O.; C. T. Baker, Covington, Ky.; and E. M. Adams, Akron, O. The next meeting of the society will be held in Cincinnati in 1910, the date being left open.

O. P. Simler, Tyrone, Pa., it is reported, is organizing a new boiler and radiator concern which will have its plant in the quarters formerly occupied by the Universal Iron Works, at West Huntington, Pa., the bonds covering this plant having been taken over by Mr. Simler. The new plant, it is said, will employ about 200 men.

Chamberlin Leakage-Stop System



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J. B. Bernhard, superintendent of the Thatcher Furnace Co.'s plant at Newark, N. J., was the toastmaster at the Newark Foundrymen's Association dinner, December 1. Mr. Bernhard is the president of this organization.

Chicago Master Steam Fitters' Association gave a beefsteak dinner Nov. 6 in the gymnasium of the Illinois Athletic Club to the Chicago Association of Heating and Ventilating Engineers. These two organizations are made up of contracting engineers and are both independent local bodies. The dinner was in return for one tendered the steam fitters by the heating engineers and was highly successful. Those who had the arrangements in charge were E. F. Capron, William L. Kroeschell, John J. Spear, George M. Getschow, George J. Phillips and Thomas J. Douglass. August Kehm, president of the Chicago Master Steam Fitters' Association, welcomed the guests and his remarks were responded to by Albert W. Long, president of the visiting association. Others who spoke were Robert Gordon, William Sullivan, E. F. Capron, Thomas J. Douglass, Fred W. Lamb, Albert S. Wills, William A. Kirk and E. J. McDonough.

National Committee of the Confederated Supply Associations, at its annual meeting held in New York, November 18, elected the following officers for the ensuing year: President, J. J. Ryan, Chicago; vice-president, W. A. Myler, Pittsburg; treasurer, L. O. Koven, New York; secretary, Frank S. Hanley, New York; board of directors, J. J. Ryan, W. A. Myler, L. O. Koven, John D. Hibbard, Chicago; J. Harvey Borton, Philadelphia; and D. L. Hamill, Buffalo.

Modern Science Club, Brooklyn, N. Y., announces the following lectures during the remainder of December: "Surface Condensers," George A. Orrok, Edison Co., New York, Dec. 21; "Blower Equipment and Systems," Arthur Ritter, American Blower Co., Dec. 28. Addresses were delivered earlier in the month on "Refrigeration," by Prof. A. G. Koenig, Dec. 7; and on "Heating and Ventilating by the Warm Air Furnace," by P. H. McCarthy, Federal Furnace League, Dec. 14.

Manufacturers' Notes

Detroit Valve & Fittings Co., Detroit, Mich., has certified to an increase in its capital stock from $100,000 to $300,000. The company is building a new plant at Wyandotte, Mich., to cost $100,000.

American Radiator Co., Chicago, will build a new factory in Kansas City, Mo.,

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STEAM BOILERS. By William S. Newell and Carl S. Dow. 160 pp., 140 illus. Cloth binding. A practical treatise on the materials and approved methods of construction of steam boilers, with complete instruction in mechanical details of the various commercial types of stationary boilers, such as the vertical, horizontal, water-tube, fire-tube, etc. Price.....**$1.00**

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ESTIMATING. By Edward Nichols. 140 pp., 35 illus. Cloth binding. Containing valuable information for the use of Architects, Contractors, Builders, Carpenters, Plumbers, and Heaters, Painters, Roofers, Cornice-Makers, and other workers in the building trade. Price....**$1.00**

STEAM ENGINES. By Walter S. Leland and Walter B. Snow. 176 pp., 63 illus. Cloth binding. A concise, practical manual for the use of Engineers, Firemen, Machinists, Oilers and Shopmen in general. The principles of operation; types of engines fitted for different kinds of work; the steam turbine, multiple-expansion engines and engine accessories. Price.....**$1.00**

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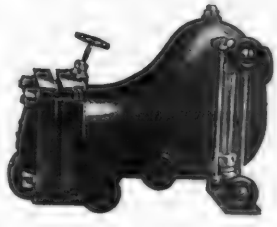

When you need a Steam Trap buy one you know will work. With a McDANIEL we take all the chances. Don't pay until you are satisfied. We have been 25 years manufacturing Steam Traps and know there is no better trap made. May we send you one for trial?

Watson & McDaniel Co.

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this winter, costing $500,000. The plant will be located on a 16-acre plot on the western side of the Blue River, and will employ eventually 1,000 hands.

Indiana Radiator Co., Walkertown, Ind., is equipping its foundry at that place with a cupola furnace for making sash weights, which will be included in its product.

Parr Valve Mfg. Co., Cleveland, O., is the new title of the Parr Regrinding Globe Valve Co. The company has increased its capital stock from $10,000 to $20,000.

Millersburg Furnace Co., Millersburg, O., has moved its plant to Canton, O., where the buildings of the Royal Foundry & Machine Co. have been secured. The company has increased its capital stock from $10,000 to $50,000. President, C. E. Alexander, Akron; secretary, F. Finger, Massillon.

Malleable Iron Fittings Co., Branford, Conn., is building a foundry, 125 ft. x 155 ft., of brick and steel, with roof of reinforced concrete.

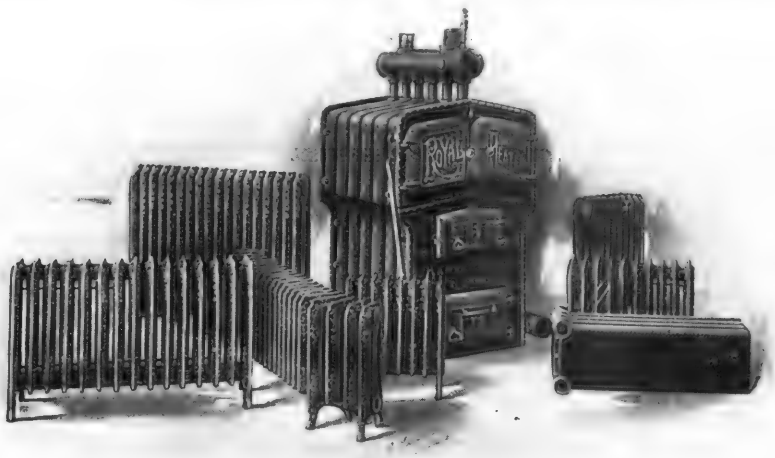
Deane Steam Pump Co., Holyoke, Mass., is building a one-story extension to its machine shop, 90 ft. x 180 ft., of brick and steel. Another proposed addition to the plant is an iron foundry, with pattern storage quarters and stock house.

Richardson & Boynton Co., New York, manufacturer of house heating boilers, furnaces and ranges, is planning to move its quarters from its present old-established location at 232 Water Street to a point uptown on 31st Street, between Fifth Avenue and Broadway. The change will probably be made in the spring.

Pittsburgh Valve & Fittings Co., Barberton, O., is building an addition to its malleable iron foundry at that place.

Royal Ventilator Mfg. Co., Philadelphia, has increased its capital stock to $100,000.

McCrum-Howell Co., New York, manufacturers of the Richmond line of boilers, announces an increase in its capital stock from $1,200,000 to $3,000,000. The increased capitalization is made up of $900,000 common and $900,000 preferred stock. The entire issue has been underwritten by a group of New York and Boston bankers, after a special visit made by the party to the company's plants at Uniontown. The dividend rate on the preferred stock has been increased from 6% to 7%. The new capital will be used for enlarging the foundries for tubs, lavatories and for radi-



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ators and otherwise taking care of the company's increased business. In addition, an unmatured bond issue of the company will be anticipated.

New Incorporations

Peerless Sanitary Hot Water Radiator Co., Delaware. Capital stock, $250,000. Incorporators: E. G. Harrison, D. B. Harrison and J. W. Ebbs, all of New York.

William Kerby Co., New York, capital $10,000, to manufacture heating specialties. Incorporators: Frank E. Kerby, Max M. Berman, both of Brooklyn.

William Highton & Sons Co., Nashua, N. H., capital $120,000, to manufacture heating and ventilating supplies.

Three-in-One Heating & Manufacturing Co., Cleveland, O. Capital stock, $5,000. Among the incorporators is James E. Potts.

United Boiler, Heating & Foundry Co., Hammond, Ind., capital $20,000, to manufacture heating supplies. Incorporators: O. Knoezer, C. H. Cass and Walter Williams.

McCambridge & Cooper Co., Philadelphia, capital $20,000, to take over the business of McCambridge & Co. and the W. S. Cooper Brass Works. The company will deal in steam fitters' and plumbers' supplies. President, Frank T. Merwin; secretary and treasurer, James E. Terry, Jr.; William S. Cooper will act as member of the board of directors and sanitary and mechanical expert.

Victor Mfg. & Gasket Co., Newark, N. J., capital $2,500, to manufacture and deal in gaskets, tools, etc. Incorporators: John H., Joseph B. and Paul Victor.

Eugene Heating & Electric Power Co., Eugene, Ore., capital $15,000, to install a central heating plant in the business section of that place.

Feild Plumbing & Heating Co., Richmond, Va., capital $3,000 to $10,000, to conduct a heating and plumbing business. President, B. P. Feild; vice-president, H. S. Morrison; secretary, F. B. Page, all of Richmond.

O'Neill Heating & Plumbing Co., Quincy, Ill. Capital, $2,500. The stockholders are Andrew Doerr, Francis O'Neill and James O'Neill.

Tuttle & Bailey Mfg. Co., Ltd., Bridgeburg, Ont., near Buffalo, has been incorporated at $40,000, to manufacture heating and ventilating apparatus. Among the incorporators are Clifford H. Tuttle, James H. Bailey, Silas Tuttle and Robert Ketting.

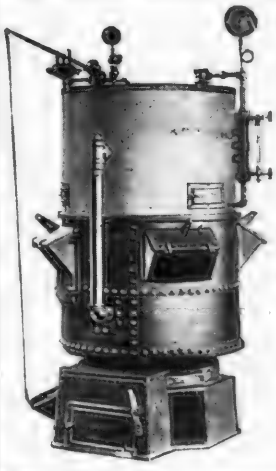
Central Culm Furnace Co., Scranton, Pa., capital $150,000, to manufacture apparatus for burning culm and coal dust, including warm air furnaces and steam and hot water heaters. President, Henry J. Gunster, of Scranton.

Co-Operative Condenser Co., Chicago, incorporated in West Virginia, capital $200,000, to manufacture machines and appliances for condensing steam. Incorporators: J. D. Hubbard, H. S. Derby, LeGrand Smith, M. A. McCollum and A. L. Pearse, all of Chicago.

Reliance Hot Water Heating Co., Chicago, capital $5,000, to manufacture heating apparatus. Incorporators: George R. Gallagher, Charles Brandt and John M. Camelon.

San Luis Boiler Compound Co., San Luis, Obispo, Cal. Incorporators: J. A. Phippen, J. H. Miller, J. J. Boyle, W. W. Phippen and J. C. Duval.

Vapor Vacuum Heating Co., Pittsburg,



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Pa., incorporated in Camden, N. J., capital $125,000, to install vacuum steam heating systems. Incorporators: A. H. Garrison, George S. Yerkes and Amos S. Fowler.

Perfect Oil Burner, Heating and Ventilation Co., San Francisco, Cal. Capital stock, $50,000. Incorporators: A. P. Janney, H. A. Whipple, C. K. Hershey, C. S. Haffman and E. T. Sherrer.

Cooper Sanitary Mfg. Co., Trenton, N. J., capital $50,000, to conduct a heating and plumbing business. Incorporators: J. B. R. Smith, F. P. Hemphill and C. S. Aitken.

Sloan Heating and Ventilating Co., Pittsburg, Pa., to engage in the manufacture and installation of heating and ventilating apparatus. Incorporators: S. J. Sloan, J. L. Fundis and E. Eisback, all of Pittsburg.

New Firms and Business Changes

Connecticut Metal Boiler Cleaner Co., New Haven, Conn., has increased its capital stock from $10,000 to $25,000, for the purpose of extending its business in New England. President, Herbert Smith; treasurer, Frederick H. Loomis; secretary, Friend A. Ives.

Heating & Lighting Co., Norwich, Conn., is the title of a new firm in the heating and lighting trade. President, Thomas C. Stearn; vice-president, Charles W. DeForrest; secretary and treasurer, Frank I. Jones.

Kennedy Co., Cleveland, O., has taken over the business of the Cuyahoga Plumbing & Supply Co., of that city, including its stock of heating and plumbing goods.

Trade Literature

Advantages of Central Station to Electric Companies is an exhaustive discussion of the benefits to be derived by electric companies by entering the field of district heating, presented in the form of a paper by Charles R. Bishop and read at a recent meeting of the New England section of the National Electric Light Association. It has been reproduced in pamphlet form by the American District Steam Co., Lockport, N. Y., and is published as Bulletin No. 116.

After discussing the early history of district heating in New England, the author compares the crude methods then employed to the modern standard equipment, accounting for the failures of other days in many New England cities to poor construction and insulation of the underground system, management left to inexperienced men, a lack of proper means and methods of charging for steam

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THE J. L. MOTT IRON WORKS

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consumed and a deficiency in data of all kinds.

Comparing the present development of district heating in New England with that in other sections of the country, the author makes the interesting statement that in the New England States there are 172 cities having a population of over 5,000 and still in but three of them is there a district heating system of any magnitude, while Pennsylvania having 82 cities of over 5,000 inhabitants, can claim central station heating plants in at least 69 cities. Illinois has 51 cities of 5,000 population and over, out of which 30 have more or less extensive systems of heat distribution, and in addition, there are heating plants in eight cities in Illinois of less than 5,000 population.

Figures are presented from a number of plants showing the profits that are being obtained from electric plants that have added district heating systems, as well as from those supplying steam heat only. The author also presents as the most important considerations that influence the degree of success of district steam heating plants, the following:

1. The climatic conditions should be such as to insure a good market for the sale of steam.

2. The generating station should be reasonably adjacent to the districts which it is proposed to serve, simply in order to reduce the investment necessary to reach the business.

3. The local conditions under which steam is sold for heating should be such as will permit fixing a rate, which, while well within economic limits from the standpoint of the consumer, can still be sufficiently high to pay a satisfactory profit on the investment over and above the cost of manufacturing steam, including depreciation and amortization.

4. Efficient management.

5. The meter system of charging. (Measured service.)

6. The total amount of business secured to the total amount procurable.

7. And by no means the least: The installation of the plant under standardized methods of construction which have proven efficient through years of actual operating experience, and by reason of which the transmission losses are reduced to a minimum, and depreciation low.

An eighth condition should be included for "live steam plants," operated purely as such, viz.: A suitable and economical boiler plant and equipment.

Foxboro Recorder for November, published by the Industrial Instrument Co., Foxboro, Mass., contains interesting matter on standard round revolution counters for either right or left rotary and reciprocating motions of machinery giving a capacity without resetting of 999,999 and 99,999,999. The remainder of

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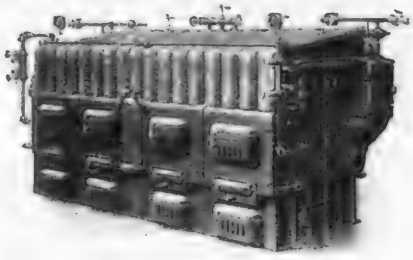

Capacity Steam
6,000 to 15,000
Square feet
36 Sizes

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"D" Series

May be used as a single boiler or by closing cut-off valve operated as two separate boilers, independently of each other

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Send for catalog of smaller sizes for residence work

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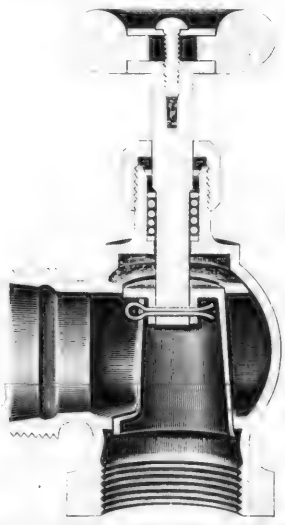
the November issue is taken up with descriptions of Horn's tachometers and testing tachographs for testing minute deviations of speed.

Genuine Detroit Radiator Valves, made by the Detroit Lubricator Co., Detroit, are attractively presented in a folder giving full price lists for the company's various types of valves. Photographic illustrations of each type supplement the descriptions. The company's present output is stated to be more than 500 different kinds, sizes and finishes of angle,



DETROIT QUICK OPENING HOT WATER RADIATOR VALVE

corner and gate valves, in regular and packless types, globe straightway and fractional valves, elbows, etc., together with means for the design and manufacture of special valves for special purposes.

Central Station Steam Company, Detroit, Mich., and its products, as described in its catalogues, are given increased prominence through the recent activities of the central station heating men. One of its catalogues, No. 2, is devoted to "The Theory and Practice of the Detroit Meter," while catalogue No. 3 deals with "General Equipment for District Steam Heating." The latter describes in detail the various materials used in a district heating system and contains a remarkable half-tone reproduction, 35 in. wide, of a typical installation of underground piping for such a system. The catalogue on condensation meters and meters for measuring boiler feed water shows types of modern apparatus for this purpose with price lists of Detroit feed water meters. Both catalogues are 6 x 9 in. Catalogue 2, 16 pp; catalogue 3, 28 pp. and half-tone insert.

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Turbines; Steam; Principals and Practice, by Thomas.....$4.00

Turbines; Water; by Wood.....$2.50

Mechanics of Engineering by Prof. Church, 1909, List $6.00. Few copies left of 1907-1908, Net $3.00

Sanitary, Water Supply and **Sewage,** of Country Houses, by "Gebhard," Net, Postpaid $2.00

Geology of Greater New York, by Gratecap, Net, $2.50

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Slotted Angle Flanges will make any angle up to and including ten degrees. Any angle up to the maximum can be made simply by shifting the two flanges to the desired position. The slot in the bolt circle gives bolt hole for any position, and after adjusting to the desired angle fitting is made up in usual manner.

AMERICAN DISTRICT STEAM CO.

Lockport, N. Y. N. Tonawanda, N. Y. Chicago

published its new Catalogue H, superseding Catalogue G, published in 1905. It is an impressive book containing 470 pages measuring 5 x 7½ in. and comprises material manufactured at the company's Kewanee works including wrought pipe for steam, gas, water and air; cast, malleable iron and brass fittings; brass and iron body valves and cocks; radiators and coils; drive well points and well supplies. Some of the illustrations, such as those of Kewanee union standard globe and angle valves, gate, check and radiator valves are shown in three colors, illustrating the brass to iron thread connections to prevent corrosion. The catalogue is one of the most complete that has come to our notice and is handsomely printed on a heavy grade of light green paper and bound with gilt edges, containing, in many cases, the name of the recipient stamped in gilt on the cover. Special attention is called to the 28-page index which is particularly complete, the subjects being indexed and cross indexed, with the idea of making it possible to find the same article under whatever name it might first appear.

Contracts Awarded

H. O. Roberts Co., Minneapolis, Minn., heating the Sheltering Arms building at that place for $2,050. Belden-Porter-Gray Co. has the plumbing contract at $2,170.

James Smyth Plumbing Co., Spokane, Wash., heating equipment for the Old National Bank building at Riverside and Stevens streets for $65,000.

Hoben & Doyle, Philadelphia, Pa., vacuum steam heating residence at Bryn Mawr for Edwin L. Blabon. The contract amounts to $3,834.

O'Shea & Larkin, Rome, N. Y., heating and ventilating new county hospital at Rome for $18,000.

J. W. Davis, St. Cloud, Minn., heating plant for the new bottling works of the Preiss & Wimmer Brewing Co. at that place.

Bryce Heating & Ventilating Co., Toledo, O., heating and vetnilating new high school building at Peru, Ind., for $12,745.

J. J. Hurley & Co., Boston, were the low bidders for the heating of the Webster school, Cambridge, at $4,965. Pierce & Cox, Boston, put in the low plumbing bid, of $2,398.

Thomas Heating Co., Racine, Wis., heating and ventilating Northern Michigan Insane Asylum at Traverse City, Mich., for $32,500.

Spencer Plumbing Co., Spencer, Ind., steam heating and plumbing court house at that place for $5,800.

H. W. Moffitt & Co., San Francisco, Cal., heating, ventilating and water supply for the new Y. M. C. A. building at Oakland. Wm. S. Snook & Son, San Francisco, have the plumbing contract, and Conlin & Roberts, San Francisco, the roofing and sheet metal work. The combined contracts amount to $200,000.

Lanning-Rapple Engineering Co., San Francisco, Cal., steam heating, ventilating and vacuum cleaning systems for the new Odd Fellows' building at Seventh and Market streets, for $5,272.

Huey Bros., Boston, were the low bidders, at $7,377, for the heating of the extension to the State House at Augusta, Me. The two lowest bidders for the

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Are Incomparably the Best for Health, Comfort and Economy
They Combine all Advantages of Other Systems
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H. W. JOHNS-MANVILLE CO.
ASBESTOS AND MAGNESIA COVERINGS ROOFINGS, PACKINGS, FIRE-PROOF AND
COLD STORAGE INSTALLATION, ELECTRICAL AND PLUMBERS' SUPPLIES, ETC.
SEND FOR CATALOG - OFFICE AND WAREHOUSE IN EVERY LARGE CITY.

plumbing were Tucker & Co., Boston, $8,236, and Reed, Stewart & Blunt, Skowhegan, Me., $8,236.

Ernst Bros., Detroit, Mich., heating and plumbing Lithgow apartments on the north side of East Grand Boulevard for Robert Williamson.

J. H. Ruckel & Son, Buffalo, N. Y., heating and ventilating the Hahnemann Hospital, in that city. 11,000 sq. ft. of Kinnear pressed radiation, mostly wall, is being used, this type having been selected on account of its lightness.

Thornton & Williams, Norfolk, Va., heating and ventilating school building at 15th Street and Moran Avenue, Norfolk, for $20,872.

A. Buchanan, Jr., Brooklyn, N. Y., heating new stores building, Brooklyn Navy Yard. 2,000 sq. ft. of Kinnear pressed radiation is being used.

Business Chances

Washington, D. C.—Sealed proposals will be received at the office of the Supervising Architect, Treasury Department, for the following-named work:

Until Dec. 20, 1909, for the installation of a hot water heating and ventilating apparatus and pumping plant in the U. S. Post-Office at Toledo, O.

Until Dec. 28, 1909, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring) of the U. S. Post-Office at Athens, O.

Until Dec. 29, 1909, for the heating apparatus for the U .S. Post-Office at Denison, Tex.

Until Dec. 29, 1909, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring) of an extension, remodeling, etc., to the U. S. Post-Office at Beatrice, Neb.

Until Jan. 10, 1910, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring) of an extension, remodeling, etc., to the U. S. Post-Office at Lima, O.

Until Jan. 11, 1909, for the extension, remodeling, etc. (including plumbing, gas piping, heating apparatus, electric conduits and wiring), of the U. S. Post-Office at Chester, Pa.

Until Jan. 12, 1909, for the extension, remodeling, etc. (including plumbing, gas piping, heating apparatus, electric conduits and wiring), of the U. S. Post-Office at Bristol, Tenn.

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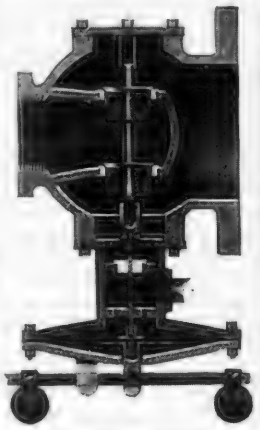

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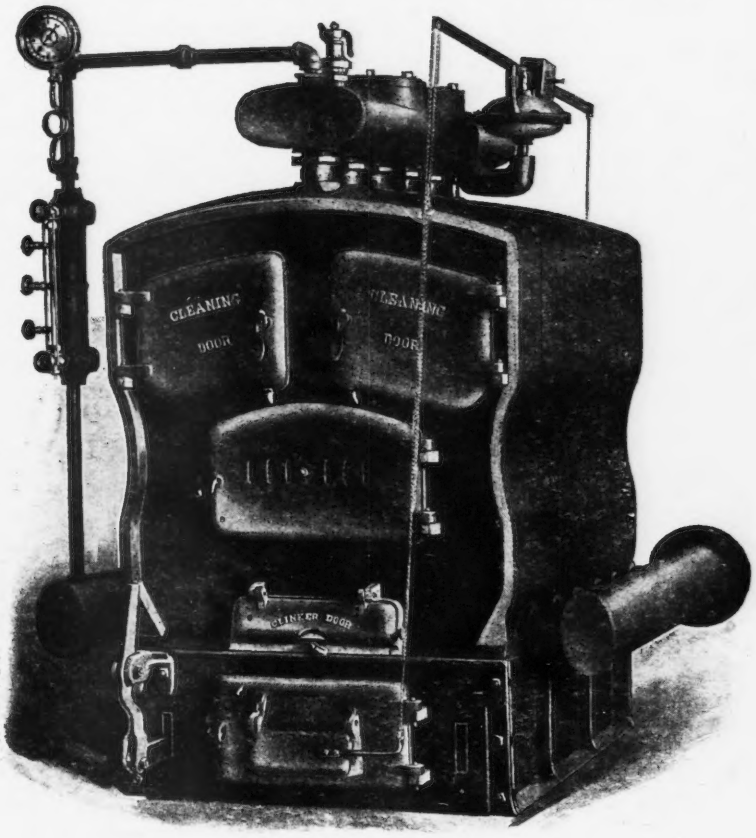

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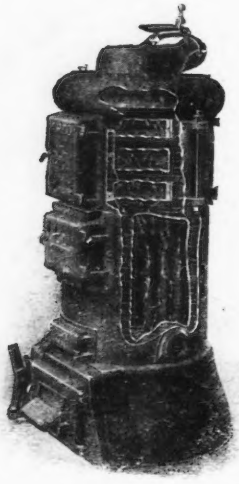

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